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DIESEL RAILWAY TRACTION

A Supplement illustrating and describing developments in Diesel Railway Traction is presented with each copy of this week's issue.

Lord Aberconway The death on Tuesday at the age of 83 of Lord Aberconway deprived British industry of one of its most courtly leaders. Following a successful career at the Bar, he became actively interested in a large number of joint stock enterprises and rapidly rose to the position of a great industrialist, concerning himself particularly with the heavy industries of iron and steel, shipbuilding, and coal mining. He leaves his mark in railway circles by reason of his active leadership, as Chairman, of the Metropolitan Railway for almost thirty years, during which time he was a constant and staunch advocate of the claims of the Metropolitan to be considered a main-line railway and not merely "the northern part of the Inner Circle with a suburban extension." When he joined the Board in 1895 the old Manchester Sheffield & Lincolnshire Railway had not yet reached London over the Metropolitan Railway tracks from Quainton Road and been transformed into the Great Central Railway. This was completed, however, before he assumed the Chairmanship, as also were the difficult negotiations regarding electrification. Nevertheless, electric traction was inaugurated under his rule and enabled him to foster schemes of building operations along his line and to serve the new residential areas with greatly improved transport facilities. Many examples may be quoted of his consistent refusal to treat the Metropolitan as a local line, notably when he sought, unsuccessfully, to obtain for it in 1928 road transport powers similar to those granted to the four group companies, and also during the protracted negotiations which led to the formation of the London Passenger Transport Board. He failed to secure the inclusion of the Metropolitan as a partner with the main-line companies in the pooling of London passenger receipts, and the absorption of his railway by the L.P.T. Board on July 1 of last year is believed to have been a source of great disappointment to him.

American Railway Results in 1933 According to a statement in *Railroad Data* by Mr. R. H. Ashton, Chairman of the American Railway Association, railroads in the United States in 1933 showed an improvement on 1932 in the financial results from operation. The chief reasons were the increase in freight traffic and the reduction in operating costs. Estimates as to earnings for the twelve months of 1933 are based on complete reports for the first ten months and an estimate by the Bureau of Railway Economics as to earnings in November and December. On this basis, gross operating revenues of Class 1 railroads in 1933 amounted approximately to $3,090,000,000, a decrease of 1·2 per cent. under those for 1932, but in the operating expenses of $2,250,000,000 there was a decrease of 6·4 per cent. The net railway operating income for Class 1 railroads for 1933 is estimated at $465,000,000, equivalent to a return of 1·77 per cent. on their property investment, as against $326,298,000, or a return of 1·25 per cent., in 1932. Measured in revenue ton-miles, the volume of freight handled in 1933 was approximately 252,000,000,000 revenue ton-miles, an increase of nearly 8 per cent. on 1932. The passenger traffic of 16,400,000,000 passenger miles was about 3 per cent. under 1932, and was the smallest annual percentage of reduction that has been reported in four years.

The Week's Traffics Increases for the past week are recorded by all the four group companies, improvement in general merchandise being shown by each company, with especially good takes by the London Midland & Scottish and London & North Eastern, while coal traffics are generally better except that there is no change on the Great Western. For the three weeks to date the four companies together show an advance of £525,000, made up of £376,500 from general merchandise, £136,500 from coal, and £12,000 net from passenger train traffic. The Liverpool Overhead and the Mersey Railways continue to show advances, the respective increases to date being £196 and £744. For the three weeks to date the Belfast & County Down is £10 up.

	3rd Week				Year to date	Inc. or
	Pass. &c.	Goods, &c.	Coal, &c.	Total.		dec. %
	£	£	£	£	£	
G.W.R. ..	− 3,000	+ 22,000	—	+ 19,000	+ 62,000	+ 4·98
L.M.S.R. ..	+ 9,000	+ 66,000	+ 4,000	+ 79,000	+ 236,000	+ 8·20
L.N.E.R. ..	—	+ 64,000	+ 19,000	+ 83,000	+ 206,000	+ 9·71
S.R... ..	+ 6,000	+ 6,500	+ 500	+ 13,000	+ 21,000	+ 2·22

Nine Months' Merchandise Traffics The improvement in the merchandise traffics of British standard-gauge railways which was noticeable in the second, compared with the first, quarter of 1933, was still more apparent in the third quarter as disclosed in the analysis published with the Ministry of Transport statistics for September last. In the twelve weeks ended March 25, 1933, the higher-class merchandise conveyed (*i.e.*, excluding Classes 1-6) was 9,737,553 tons, a decrease of 1,127,463 tons or 10·38 per cent. in comparison with the corresponding period of 1932, the receipts therefrom being £8,292,903, a decrease of £1,050,123 or 11·24 per cent. During the period March 26 to July 15, 1933, tonnage amounted to 13,142,813 tons, a decrease of only

131,777 tons or 0·9 per cent., the receipts being £11,388,635, a decrease of only £163,135 or 1·4 per cent. For the twelve weeks ended October 7 the tonnage conveyed was 10,397,114, an increase of 721,840 tons, and the receipts were £8,873,571, an increase of £519,175. The advance in merchandise and minerals (Classes 1-6) is still more remarkable. At March 25 the tonnage was 8,781,418, a decrease of 1,010,036 tons or 10·32 per cent., with receipts of £2,405,004, a decrease of £182,615 or 7·06 per cent. During the period March 26 to July 15, however, with 13,188,039 tons and receipts of £3,562,068, there were increases of 385,222 tons and £58,524, and in the 12 weeks ended October 7 the 9,931,207 tons conveyed showed an increase of 1,650,165 tons, and the receipts of £2,629,221 an increase of £414,727.

Port Reorganisation Present day dock problems require a Royal Commission to themselves, as Mr. Frank Brown maintains in his paper recently read before the Institute of Transport and summarised on another page of this issue. Even before the war the potential capacity of the ports was far in excess of the volume of business offering, and dockowners have now been faced for a long time with the problem of diminishing trade. Well over £200,000,000 of capital is now represented in docks, none of which earned as much as 4 per cent. in 1932, the best returns being Liverpool 3·79 per cent., London 3·75 per cent., and Bristol 3·62 per cent. There are at present four main classes of dockowners:—The four group railways with a dock capital of £68,000,000, the Manchester Ship Canal Company with a capital of £20,200,000, public trusts with a capital of £110,000,000, and the Bristol Corporation with a dock capital of £8,500,000. In their aims, practices, and charges, and in the areas from which they draw their traffic there must necessarily be much variation, and while the interests of the public trusts and of the municipalities must of necessity be largely local, those of the railways need not be so. The report of the Royal Commission on Transport in 1931 was in favour of port grouping for particular areas, preferably under a public trust, but Mr. Brown is not sanguine as to such a scheme being brought about by agreement in the near future. Reorganisation if it comes must be a gradual process, embodying certain features which Mr. Brown sets out in detail.

English Coaches in America Probably the longest record of train departure time that has continued unbrokenly on the American Continent is that of the Fall River boat train, which has left Boston at 6 p.m. daily, Sundays included, since October 11, 1875—a total of 58 years. An even more remarkable record is that of Conductor Asa R. Porter, who officiated continuously on this train for 32 years, from 1864 to 1896. It was on May 19, 1847, that the Fall River service was instituted, and it still enjoys considerable popularity as an inexpensive route connecting the cities of Boston and New York. The steamers between Fall River and New York ply in the sheltered waters of Long Island Sound, so that a comfortable night journey is enjoyed on the water, with an evening departure from Boston or New York, and an arrival first thing in the morning. Another point of historical note about the Fall River boat train service was the construction, after the son of the Old Colony Railroad President had visited England, of a couple of compartment coaches after the English model, which were looked upon as a great novelty. So much so, indeed, that the rival Stonington Line, which ceased to function in 1904, constructed a similar "European carriage" (illustrated on page 128) in order to compete effectively. But the idea did not take on in the U.S.A.; the three coaches ran from 1868 to 1878, and the Stonington Line coach placidly ended its days, minus wheels, as a refreshment room at Oakland Beach, Rhode Island.

Sierra Leone Railway Revenue during the year 1932, as shown in the report recently forwarded to us by Mr. F. E. M. Beatley, the General Manager, amounted to £159,862, an increase of £13,363 in comparison with 1931, which was very satisfactory in view of all the circumstances. In the working expenditure of £149,294, which included £3,082 on extraordinary works, there was a reduction of £3,115, and the operating ratio was brought down from 104·03 per cent. to 93·39, leaving a profit on working of £10,568, as against a loss of £5,909 in 1931. Loan charges, &c., amounted, however, to £68,399, and the final result of the year's working was a deficit of £57,831, comparing with a deficit of £74,292 in 1931. The length of running lines now open is 310 miles on the 2 ft. 6 in. gauge, consisting of the main line of 227 miles from Freetown to Pendembu and the Bauya-Makeni branch of 83 miles. In palm-kernels, the principal revenue-producing commodity, the tonnage (41,945) constituted a record for the railway, and the receipts therefrom increased from £41,038 to £52,033. Passenger journeys increased from 252,472 to 408,149, passenger receipts from £25,405 to £29,103, and public goods traffic earnings from £83,317 to £94,609. Goods ton-miles were 9,932,466, an advance of 1,395,470; the average haul increased from 138·01 miles to 150·44 miles, and the average wagon load from 6·13 tons to 6·24 tons.

Rail and Road Unification in Germany The scheme for a network of special motor roads in Germany has been actively developed by the Government for the immediate purpose of providing increased employment, particularly for unskilled labour, and with the ultimate object of augmenting and rationalising the transport facilities of the country. An important development in this direction is announced in connection with a conference recently summoned in Berlin by Dr. Todt, General Inspector of German Highways. The assembled engineers and directors of the new motor roads were addressed by Herr Hitler, who referred specially to the fact that the German State Railway, which he has entrusted with the construction of the roads, would also undertake their operation. There would thus be established a great unified transport undertaking guaranteeing the best possible utilisation of road and rail facilities from the economic standpoint. The full benefit resulting from the projects would be realised within the next six to eight years, when the network of roads was completed; meanwhile, the community would benefit greatly from the employment provided by their construction. At the conclusion of Herr Hitler's address, Dr. Dorpmüller, General Manager of the German State Railway, dealt with important measures newly developed in preparation for the building of the roads.

More Speed in Brazil Experiments have been made recently by the Leopoldina Railway with a view to cutting the train times over its principal main line between Rio and Campos, which, like the remainder of that system, is of metre gauge. The difficulties in the way of acceleration are considerable; apart from the initial 21 miles out of Rio, the whole of the 196 miles is single-track, sharply undulating to a maximum steep-

ness of 1 in 70, and to a large extent earth-ballasted, though stone ballasting is now in progress. Even the best trains make 30 booked stops between Rio and Campos, with other out-of-course stops to cross trains running in the opposite direction; parcels traffic is heavy, and some of the stops are much increased in duration to allow the replenishment of the locomotive tenders with wood fuel. Fast running of the order of that obtaining over the 3 ft. 6 in. gauge of Java and Japan is not therefore possible; on runs averaging less than six miles in length between stops, speeds of 40 m.p.h. are attained, and occasionally up to 44 m.p.h. At present the fastest time for the Rio-Campos journey is scheduled at 8 hr. 25 min., stops included, but cuts up to 34 min. have experimentally been made in the running times, and on the completion of certain improvements to the track, it is hoped that an acceleration of at least an hour in each direction may become practicable between Rio and Campos, with maximum speeds up to 75 km. (46½ m.) an hour or slightly over.

Large or Small Wagons? Perhaps it is a blessing that we in this country are a conservative people and have resisted the propaganda for bigger wagons. It appears that in the United States, where the goods rolling stock is all of the large bogie type, there has arisen an agitation for the introduction of small cars. We should perhaps not have said that all American goods stock was large, for there is one four-wheeled goods vehicle at work in the United States, and it is apparently the success of this vehicle that has sown the seed of the agitation to which we have referred. It is argued that one of the most effective ways to regain traffic lost to road motor transport would be to introduce on a large scale these small cars to deal with the smaller consignments now common, for only about 32 per cent. of all freight cars on the United States railroads at present are loaded to full capacity. That means that a high percentage of the weight hauled about the country in goods trains is unloaded and therefore uneconomical. It is curious to read in a recent issue of the *Railway Age* the various arguments advanced in favour of the small freight wagon, to compare them with the contrary arguments so often heard in this country in favour of the opposite, and to realise what we have escaped by resisting the pressure of the reformers!

Railway Bridge Stresses Of the two papers presented to the Institution of Civil Engineers for discussion last Tuesday, and briefly summarised on page 143 of this issue, that by Messrs. Foxlee and Greet, which is essentially a mathematical treatise, is likely to provoke heated controversy. In fact Professor C. E. Inglis, who opened the discussion, trained all his guns upon the authors, and they were heavy guns from the mathematical genius of the Bridge Stress Committee. We will not here enter into the pros and cons of the discussion, but we were not sorry to listen to Professor Inglis's eloquent protest against the dangers of standardisation in general. Standardisation, he agreed, was applicable to certain things, but any attempt to "standardise the tree of knowledge" was liable to be fatal. As to Mr. Gelson's paper, there is less likelihood of any controversy. It is a plain but valuable record of a continuation in India of the Bridge Stress Committee's tests in this country, and of the conclusions based upon the facts revealed thereby. It deals exclusively with short span bridges, and, as this kind of bridge predominates on railways all over the world, its usefulness will be great. Finality as to knowledge of bridge stresses and track stresses is still far ahead, but progress is more rapid now than it has ever been before.

High Speed Steam Traction in Germany Increasing interest is being shown at the present time in the development of high-speed railway traction, using various forms of propulsion, the basic principle in many cases being that of employing independent vehicles of the rail motor type, or light weight trains with the motive power incorporated and arranged to form a unit, in the design of which streamlining plays an important part. This matter is receiving close attention in Germany at the present time, and the statement issued by Dr. Dorpmüller, of which an abstract appeared on page 66 of THE RAILWAY GAZETTE dated January 12, made it clear that new types of high-speed steam locomotives and trains of streamlined construction would before long be brought into service on the main lines of that system. We recently discussed this interesting subject with certain of the directors and chief engineeers of Henschel & Sohn A.-G. at their works at Kassel, and by their special permission we are enabled to reproduce in another part of this issue illustrations of three different designs they have prepared to meet requirements. This firm has taken a leading and enterprising part in the development of locomotive design for special high-speed service, and has for some time past been closely investigating the various problems associated therewith. The designs they have prepared include two with the 4-6-4 wheel arrangement for operating normal main line trains at speeds of 150 km.p.h. (93·2 m.p.h.), and a special 4-4-2 type tank locomotive with inside cylinders and 7 ft. 6½ in. diameter coupled wheels, incorporated in a streamlined train with a double, articulated passenger car, forming a combined unit capable of running at speeds up to 160 km.p.h. (100 m.p.h.). These designs are, we understand, at present being considered by the Reichsbahn authorities.

Roller Bearing Locomotives The report of the Committee on Locomotive Construction to the American Railway Association contains some further particulars relating to the performance of the Timken roller bearing locomotive constructed in 1929 and since purchased by the Northern Pacific Railroad. This locomotive, which is of the 4-8-4 type, was completely equipped with roller bearing journals and was tried out on several railways. The results have established the fact that, on account of the reduced friction permitting a larger percentage of the piston thrust to be delivered at the rail, a roller driving-bearing locomotive is prone to excessive slipping of the driving wheels with the usual factor of adhesion, although more recent applications apparently have not taken this into account. The locomotive thoroughly demonstrated the anticipated freedom from hot journals and attendant axle failures, lateral wear, shoe and wedge troubles, and greatly reduced internal friction losses. The roller bearings were in one instance subjected to unusual strain due to the rods stripping, but it was reported that the bearings were not harmed. The report goes on to say that with driving axles rather more definitely fixed in position as they are liable to be in roller bearings, it would seem necessary to take greater care in quartering and stroking all crank pins in order to avoid increased strain on pins and side rods, especially with new bushes and slight tolerances in the axleboxes and horncheeks. Three of the American railways have decided to apply roller bearings to the leading bogies of existing locomotives and one of them, the New York Central, has already equipped eighty-five 4-6-4 type engines.

Canadian National Operations

A REVIEW of Canadian National Railway activities during 1933, by Mr. Samuel J. Hungerford, Acting President, published in the *Canadian Railway and Marine World*, estimates the net revenue for 1933 at $6,000,000, an advance of $104,000 on the results for 1932. Though the estimated revenues of $148,500,000 are $12,604,000 below the figures for 1932, there has been such a close budgetary control of expenses that, at $142,500,000, they show an estimated reduction of $12,708,000. By the end of 1932 passenger train services had been reduced by more than one-third from pre-depression level. Efforts to effect further reductions without undue hardship to the communities served, continued in 1933, and the pooling of passenger train services between Ottawa and Toronto and of the fast afternoon trains between Montreal and Toronto by the Canadian National and Canadian Pacific enabled further substantial train service economies to be made.

Other economies have resulted from arrangements for joint operations, such as shunting, car cleaning, and freight shed operation at a number of points where duplication existed, as well as the hauling of traffic by one railway for the other, and many similar projects are under study by the joint co-operative committee, consisting of three technical officers of each company. This committee was appointed by a joint executive committee, consisting of the executive head and two directors of each railway, which had been organised in November, 1932, to take steps towards effecting co-operative economies before the passing of the Canadian National-Canadian Pacific Act of 1933. Notwithstanding the drastic economies effected, the operating efficiency of the Canadian National Railways has improved, as shown by comparative figures of the first 10 months of 1933 with the relatively prosperous year 1929. Gross tons per freight train have increased from 1,476 to 1,933, gross ton miles per freight train hour from 19,740 to 24,822, and freight train miles per freight train hour (speed) from 13·4 to 15·9.

As a further step of co-ordinating the railway passenger service with aeroplane service arrangements have recently been completed, in conjunction with certain United States railroads to participate in a joint passenger air service between Boston and Montpelier, Vt. Mr. Hungerford sees distinct signs that the bottom of the depression has been reached and that the years ahead will be years of recovery, with a return to sane prosperity. He is distinctly hopeful of business conditions producing substantial increases in traffic, and is confident that the Canadian National will respond to this increased traffic with substantially increased net earnings.

Russian Railway Progress

IN the State Budget of the U.S.S.R. for 1934—which, by the way, appears to be a model of orthodox finance and estimates a surplus little less than that of the 3,000,000,000 roubles realised, according to preliminary figures, in the last financial year—expenditure and revenue on railway transport account are estimated at 3,736,000,000 and 2,633,500,000 roubles respectively. Presumably the former figure includes additions to capital equipment since, we gather, the Russian railways—like our own Post Office—have no separate capital account. According to the latest monthly review of the Moscow Narodny Bank, special attention is to be paid during the coming year to providing the railways with the necessary quantity of rolling stock and equipment to enable them to carry out in full the transport programme. Of the 1,253 new locomotives to be built, 300 are to be turned out of the new Lugansk works which, when it gets going fully, is programmed to build 1,080 engines a year, of heavy main line type. Improvements on the railways during the last few years are indicated by official statistics showing that, whereas in 1930 only 37,000 wagons were equipped with automatic brakes, by the end of 1933 there were 104,500; that there are now over 1,500 miles of line equipped with automatic signalling, against none in 1930; that automatic coupling, unknown on Soviet trains before 1930, has been introduced on 5,000 tank wagons serving the Baku-Batoum line and on the coal wagons on the Donetz-Krivoy section. The average daily run of goods wagons, only 89·5 km. in 1930, rose to 106 km. during the first nine months of 1933. At the beginning of 1930 there were only 45 km. of electrified lines; at the end of 1933 there were 410 km., and another 1,090 were reported being electrified. The total length of the railway system in the Soviet Union has been increased during the past fifteen years by 43 per cent., about 12 per cent. of which has been completed since the beginning of the first five-year plan.

Railway Signalling in Australia

AS Mr. C. W. Prescott, the author of the paper entitled as above, submitted to the Institution of Railway Signal Engineers on December 13 and summarised in our issue of December 15, resides in Australia, it was read in his absence by the Hon. Secretary, Mr. M. G. Tweedie. The discussion which followed was interesting in that those who spoke, other than Mr. H. E. Morgan, Mr. A. W. Woodbridge and the President (Mr. W. Challis), were all former officers of the Signal and Telegraph Department of the Victorian Government Railways. These were Mr. F. Raynar-Wilson, Mr. J. C. Kubale, and Mr. G. H. Crook. The contribution of the first-named of these three was particularly entertaining, as he went, in October, 1914, from our Metropolitan Railway—where, incidentally, he was under the President—to assist in the installation of automatic signalling for the electrification of the Melbourne suburban railways. Mr. Wilson's remarks had the added attraction of being accompanied by the exhibition of some 30 lantern slides. That prompted Mr. Morgan to remark that the Institution had been presented with the equivalent to another paper on the top of Mr. Prescott's.

Those present appeared to be much impressed by the progress in signalling that had been made by all the State railway administrations in Australia—in power and automatic signalling, colour light signals, speed signalling, long-distance point operation, absolute permissive block (A.P.B.) on single lines, &c. On the last-named point Mr. Wilson corrected the author as to its first use in Australasia. Mr. Prescott said that that was in New Zealand, but the first installation was in Victoria, where it was opened on December 22, 1921, some months earlier than the New Zealand example. Mr. Kubale added to the useful historical data given by the author some interesting facts as to the Victorian Railways. The first of these was opened in 1854; interlocking was introduced in 1876 and telegraph block in 1880. Needle block followed in 1883, the electric tablet in 1892 and lock-and-block in 1896. Track circuit was installed as long ago as 1897, in which year the electric train staff was introduced.

Mr. Crook referred to the electro-mechanical frame—where the points are worked by rodding as usual and the signals actuated electrically—as a neat contribution which was particularly suitable where the bulk of traffic was through traffic. The most interesting feature in Mr. Crook's remarks related to the electric tramway crossings over the rails of the electrified area in Melbourne. There, a small isolated section of overhead wiring was made common to both railway and tramway and was energised at 1,500 volts for the railway and 600 volts for the tram-

way, the correct voltage being controlled by the position of the level crossing gates. The return rails were isolated and similarly connected to either railway or tramway system as required. The crossing section was also track circuited so that in the event of an over-run on the railway the tramway circuit breakers were tripped. The tramway was protected by derails and road signals. The track circuiting of the level crossing presented a peculiar problem, as occasional contacts across the insulating tramway joints occurred, allowing a d.c. flow of anything up to 800 amps. from railway to tramway system. This condition was met by utilising the two sections of an ordinary impedance bond as an isolating transformer for the track relay. Contactor switches for connecting the level crossing rails with either railway or tramway system were designed, manufactured and installed by the Victorian Railways Signal Engineer.

The Rail Wear Problem

A PASSAGE of no small importance in the paper read recently by Mr. R. J. M. Inglis before the Institute of Transport, entitled "The Engineer in Transport," was that relating to the wear of rails. Every year one of the heaviest financial burdens of track maintenance is the renewal of worn rails; little short of two million pounds is spent annually by British railways on the purchase of new rails, almost entirely for replacement purposes. Reference was made in the paper to rails which have remained continuously in use for periods from forty to upwards of fifty years, whereas at the present day one-half or one-third of this figure represents the average life of a rail, and much less in a location in which traffic conditions are very severe. The Engineer responsible for permanent way maintenance not unnaturally enquires, therefore, why rails cannot be rolled to-day with the same wearing qualities as those of their predecessors, assuming from this comparison that the quality of the present-day rail is considerably inferior—even allowing for the vast increase in train loading, frequency, and speed which has taken place in the interim—to that of the rails made in the early years of steelmaking. The answer is, in the first place, that if the manufacturer were to-day to submit to the user rails made to the analysis of these early rails, the modern product would almost certainly be rejected. Its content of sulphur and phosphorus would probably be well outside present-day limits, and it is doubtful if such rails would withstand without fracture the impact of the falling weight test. The fact appears to be that when steel was first introduced, rolling stock development had been hampered by the limited carrying capacity of the iron rails until then in use; the first steel rails were, therefore, far in advance of the traffic conditions of their time. Consequently they lay for years in the tracks, suffering but little in the way of abrasive wear, but gradually toughening on their running surface by the effect of work-hardening as the rolling loads passed constantly over them. By now work-hardening and age-hardening have had their effect, and in the subsidiary main lines or branches in which these rails are still laid they may continue in service indefinitely. If it were possible to reproduce to-day the conditions in which the early steel rails were rolled—with low rolling temperatures, more work done on the metal in the mill, and so on—not only would production costs be so increased that the remedy might prove more costly than the disease, but in modern traffic conditions these rails would not have the opportunity to benefit by work-hardening as did their predecessors.

Further, the risks attaching to such analyses—without the toughening assistance of work-hardening—are evident as we come to the next period of track history, and consider such disastrous accidents as the St. Neots derailment on the Great Northern Railway in 1896, caused by a broken rail. This serious casualty drew pointed attention to the desirability of more rigid rail specifications, and probably was largely responsible for the production of the first British standard specification for rails in 1904. It is noteworthy that since that date not one single railway accident in Great Britain involving loss of life has been attributable to a broken rail, or, indeed, any really serious derailment. On the other hand, there seems little doubt that the standardised analysis of the British Standard Specification, narrowly limited in its details, has tended latterly to arrest progress in rail steel composition. The wearing capacity of rails manufactured in accordance with its provisions has remained stationary, while the weight and speed of the traffic passing over them have unceasingly increased. And while it would be difficult to overrate the value of the safety record to which we have just referred, it is possible that this safety has been secured at the cost of an excessive caution which has deprived rail-users of potential rail-wear. At the present time the need is to discover some rail steel composition or treatment which will give the same capacity for work-hardening as was given by the early steel rails when they replaced those rolled from wrought iron. Useful steps forward have been taken recently, but they have, of course, involved a break-away from the B.S. specification. One of the most important has been the recognition of the toughening value of manganese, and all the four British main line railways are now specifying 1·0 per cent. of this element, or thereabouts, in their rails (in place of the previous maximum of 0·8 per cent.), coupled with a reduction of 0·05 per cent. in the carbon content, and the result has been to increase rail-wear, as compared with rails made to the B.S. specification, by 25 to 33 per cent., with no additional cost to the user. Manganese also figures in certain well-known alloys, containing from 12 to 14 per cent. of that element, which in their capacity to harden through the work done on them by the rolling load have probably no superior, but the price of rails of this quality is prohibitive except in locations where the traffic conditions are exceptionally severe. Chrome steel is another useful alloy of which considerable use is being made in rails at the present time, chiefly those required for switch and crossing manufacture.

Considerable progress has also been made in heat treatments, applied to the rail for the purpose of increasing wearing capacity. The principal research in this direction has been that associated with the name of Sandberg, and now developed to the point at which a highly controlled quenching treatment can be applied to the rail-head, producing a structure of pure sorbite, which is the maximum combination of hardness and toughness in steel. On the Continent quenching has been carried even further, to the extent of producing martensite—the hardest of all steel structures—in the rail-head, but whether these martensitic rails are sufficiently free from brittleness to withstand fracture in the road, time alone can prove. Compound cast rails have also been rolled abroad, with a head of hard-wearing alloy, and a web and foot of mild steel, but these also are not as yet much beyond the experimental stage. In seeking the rail of the future, the railway engineer will do well not to tie down the manufacturer too rigidly in the matter of analyses, or even physical tests, provided that the safeguard of the falling weight test is always maintained. A little less of the restraint of specifications, and a little more co-operation with manufacturers in research, is likely to provide the best solution of the rail problem.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of Correspondents)

The Signal Engineer's Department

Margate, January 22

To the Editor of The Railway Gazette

Sir,—In your issue of January 19 mention is made by "Axed" of an article, "The Signal Engineer's Department," as given in your issue of December 29.

In my opinion, signal engineers and their staff on overseas and colonial railways do not receive full recognition of their services to the railways. In many cases, other departments have been heard to ask why signal engineers and their staffs are necessary, as once the signal apparatus and instruments are installed, there appears to be no need for the signal engineer. It seems a pity that this evil is not stamped out and that the general manager and "the powers that be" are made to realise the importance of having a signal department. The present trend appears to be to do away with signal engineers, or to cut the department as much as possible and work on a skeleton staff.

Cannot the Institution of Signal Engineers offer a protest against this evil—to advocate a full signal staff on all railways, pointing out the necessity of safety, &c.? Surely they are a body which can, and should, serve a useful purpose. Unfortunately, I am a signal assistant on a colonial railway, which is already considering "cuts" in the signal staff, and I am afraid, if my name were known, I should certainly be down "to go."

Yours faithfully,

"HOME ON LEAVE"

The Royal Scot in America

Canadian National Railways,
17-19, Cockspur Street, S.W.1.
January 16

To the Editor of The Railway Gazette

Sir,—In the course of an article dealing with "The Royal Scot in America" in the issue of The Railway Gazette dated January 12, this sentence appears:—

> Compartments of the British type are comparatively rare in America, and when provided, are usually limited to two or three to a car, the remainder of the car comprising ordinary sections and one or two drawing rooms with three sleeping berths each.

Had the writer examined the passenger equipment in use on the Canadian National Railways he would have found a sleeping car quite comparable with the first-class sleeping car in use on the Royal Scot and other night trains operating in this country. For example, on the Inter-City Limited, the night train operating from Montreal via Toronto to Detroit and Chicago, the equipment includes a sleeping car of the type known as a chambrette, each car consisting of fourteen single rooms each of one bed only. In the reverse directions into Montreal similar sleeping car equipment will be found on the Maple Leaf which passes through Toronto at night on the way to Montreal. Cars of this type are of similar dimensions to the standard sleeping car and the weight would be approximately the same, 75 tons. These cars are of Canadian design and have been in use on the Canadian National Railways for some years.

Single room accommodation will also be found on other trains. For example, there is a buffet lounge solarium car used on the International Limited between Chicago and Toronto which contains, in addition to lounge space, one drawing room, two compartments and three chambrettes. The drawing room will have sleeping accommodation for three persons, the compartments for two persons each and the three chambrettes will each have one bed, total accommodation for ten individuals.

There is in service on the night train between Montreal and Quebec another type of sleeping car containing six sections such as would be found in the standard sleeping car, one drawing room and four single rooms. There are several variations of this form of combination car, some of which are devoted exclusively to sleeping accommodation, while others usually known as "club-cars" provide a lounge space in which light refreshments are served.

The writer refers to tourist sleepers as being run only in the West but includes this type of car in order to give "the nearest equivalent possible to the British third-class sleeper." Tourist sleepers are used by the Canadian National Railways on the Continental Limited which operates daily in both directions between Montreal and Vancouver. These cars are similar in design to the standard sleeping car but all the space is devoted to berths, each car having fourteen sections. Tourist sleeping cars differ from the standard sleeping cars only in the fact that their seating is leather covered instead of the finer materials used in the standard cars. Linen and bed equipment is similar to that used in the standard sleeping car and a porter is present to make up beds and render the same service as his mate in the standard sleeper. It will be seen then that the tourist sleeper offers superior service to that of the British third-class sleeper.

There is one other type of sleeper in use on these transcontinental trains and these are known as colonist cars. The colonist car follows the general design of the standard sleeper and offers comfort in its plainest form. In this type the traveller supplies his own bedding. The compartment at one end is fitted with a range by means of which economically minded passengers may cook *en route*. On trains carrying colonist cars a lunch counter service is offered at moderate prices.

Yours faithfully,

C. J. HANRATTY,
Publicity Representative

Cheap Fares in Italy

Italian State Tourist Department,
16, Waterloo Place, S.W.1.
January 11

To the Editor of The Railway Gazette

Sir,—With reference to the article "Italy—Cheap Fares" in your issue of December 22, the periods during which tickets at 50 and 70 per cent. reduction are issued by the Italian State Railways have been revised. Return tickets from frontier stations and ports to all destinations in Italy at 50 per cent. reduction (70 per cent. for parties of from 25 upwards) and circular tickets at 30 per cent. reduction, will be issued until September 30. It is only the tickets to Rome at 70 per cent. reduction for the Fascist Exhibition which will cease on April 21; after that date travellers to Rome will, of course, be able to avail themselves of the tickets at half fare mentioned above.

The fact that the so-called "return" tickets in Italy are available for use from and to different frontier stations or ports on the outward and homeward journeys is a great convenience to those who wish to visit a number of cities or resorts en route; for example, a ticket Modane (Mt. Cenis route)—Rome-Chiasso (St. Gothard route) would enable the holder to break his journey at Turin, Genoa, Rapallo, Pisa, Leghorn, Florence, Bologna, Milan, and Como, and many other resorts and places of interest.

A slightly different system of reduced-fare railway travel is used in connection with visits to Milan, Verona, Padua, Bari, &c., when the sample fairs and exhibitions are held. The traveller is provided with a booklet containing six vouchers, each entitling him to a ticket at half fare on the Italian State Railways. In exchange for coupon No. 1 he can buy *in advance* a ticket at 50 per cent. reduction from a frontier station to the city where the fair is being held; after the booklet has been stamped at the exhibition the remaining coupons become valid and five journeys may be made (at half fare) from point to point anywhere in Italy.

Yours faithfully,

W. STORMONT,
Manager.

PUBLICATIONS RECEIVED

Kempe's Engineer's Year-Book, 1933-34. London: Morgan Brothers (Publishers) Ltd, 28, Essex Street, Strand, W.C.2. 2623 pp. 7¼ in. × 5 in. × 3 in. Price 31s. 6d. net.—The 40th edition of "Kempe's Engineers' Year-Book" for 1933-34 has been much more extensively revised than usual. Several entirely new and excellent articles have been written, and most of the material which in the course of time had become redundant or out of date has been cut away. Of articles which have been completely rewritten, those on permanent way and signalling are specially commendable. The new volume has been divided into two main parts, the first containing the sections dealing with technical data and principles, and the second section giving useful descriptions of various products of engineering firms. The 40th edition is a notable achievement and an invaluable *vade mecum* for the engineer.

Geschwindigkeitssteigerung auf der Schiene (Increasing the Speed of Railway Travel). By Direktor Dr. Leibbrand, of the German State Railway. Reprinted from the *Verkehrstechnische Woche*. Berlin: Otto Elsner. 1933. 8¼ in. by 5¾ in. 28 pp.—This pamphlet is a reprint of a lecture delivered at a conference of Senior State Railway Officers at Berlin, at the 25th anniversary of the foundation of their association. Its object is to discuss the general question of increasing the speed of travelling by rail. It is not merely the actual speed of trains that needs to be considered, but the time taken to get to and from the station, to obtain tickets, deal with luggage, &c., and, when changes or stops on the way are involved, the duration of these. Most lines are suited to higher speeds than are, as a rule, now being run over them, and to attain higher averages is mainly a matter of design and construction of vehicles and improved operating methods. Air resistance begins to play a rapidly increasing part, at speeds over 20 m.p.h. With certain railcars, when travelling at 90 m.p.h., for example, of the 800 h.p. expended in driving them, only 107 are due to the weight and general resistance, the remainder being expended in overcoming the effect of the air. Rapid acceleration is important too, and weight reduction is also a consideration, but its importance can be exaggerated in the case of long-distance runs. It is a mistake, Dr. Leibbrand thinks, to sacrifice comfort to save a little weight. Streamlining and the use of roller bearings are more important than mere weight reduction. There is room for improvement in braking, and the aim should be to obtain the maximum deceleration consistent with the comfort of the passengers, so that distant signals do not have to be placed a long way out from their stop signals, as this causes a correspondingly greater delay to slow trains when the signal is against them. The waste of energy involved in ordinary braking is great and engineers might devote more attention to regenerative braking and the problem of the adhesion between rail and wheel. Dr. Leibbrand is convinced that the future must bring a large extension of railcar working, and he looks to it to increase greatly the convenience of railway travelling. Speeds of 110 m.p.h. on main lines and 60 m.p.h. on *Nebenbahnen* are suggested. Frequent services, high acceleration and frequent stops, so that even small towns can benefit where they now see the expresses pass them by, could be obtained with railcars.

Garcke's Manual of Electrical Undertakings and Directory of Officials, 1933-34 Edition. Volume XXXVI.—London: Electrical Press Limited, 13-16, Fisher Street, Southampton Row, W.C.1. 2003 pp. and 20 maps. 8½ in. × 6 in. × 3 in. Price 35s. This 36th volume of Garcke's Manual well sustains its reputation as an indispensable work of reference for all who are interested in the electrical industry. It contains financial, technical, commercial, and general information relating to approximately 5,250 undertakings (municipal and company), under the headings of electric supply, electric traction, telegraphs and telephones, manufacturing, contracting, electrical investment, and miscellaneous; there is also a directory giving the names and addresses of some 17,000 directors and officials, municipal supply and traction committees, &c. The volume closes with a general index, giving a comprehensive list (with cross references) of all undertakings mentioned in the Manual. In the first section, dealing with electric supply and traction, there is a complete record of undertakings throughout the British Empire and of British-owned concerns in foreign countries, the information including statutory powers, areas of operation, history and progress, finance, &c. Amongst the 20 maps provided are those of the North Eastern area electrified lines of the L.N.E.R., both the London and Lancashire electrified lines of the L.M.S.R., the electrified lines of the Southern, and the London Traffic Area.

The Port of Bristol.—The 1934 handbook of the Port of Bristol contains, as in past years, a wealth of information on the activities of the port. A large section is devoted to particulars of the various facilities available to shipping, while details of the City's principal imports and exports are also fully described. An interesting feature of this latter section is that showing the geographical advantages of Bristol as a distributing centre. Copiously illustrated throughout and printed on art-surfaced paper, the handbook also contains large folding plans of the various docks owned by the Authority, together with tables setting out ocean distances, liner services, port dues, tides, and lists of the various trade and commerce associations, and consuls and vice-consuls in Bristol.

British Industries Fair, 1934.—The special overseas advance edition of the catalogue for the 1934 B.I.F., Olympia and White City sections, has now been published. There are 554 pages of general information, exclusive of advertisements. An alphabetical list of exhibiting firms, together with brief summaries of their products, is supplemented by a classified list of exhibitors, and a general index in nine different languages.

Great Western Railway Ports, 1934.—The 1934 edition of the Great Western Ports handbook is now available. Each of the company's ports receives a separate description setting out various facilities provided, and in each case an excellently-produced folding plan is included. Attention is drawn to the improvements and extensions that have recently been effected. Those carried out with Government assistance under the Development (Loan Guarantees and Grants) Act, 1929, were the subject of an illustrated article in the Special Supplement dealing with G.W.R. Development Works, presented with THE RAILWAY GAZETTE for December 8 last. When brought together in the confines of a single volume of 326 pages, the diversity of the G.W.R. ports is particularly striking—Swansea and Brentford, Cardiff and Weymouth, Fowey and Plymouth, for example, provide strong contrasts. The back pages of the handbook are devoted to tables of trade statistics, dock accommodation, steamship services, dock rates, and a mass of other miscellaneous information of interest to all dock users.

Hotels in Great Britain.—In order to make things as easy as possible for overseas visitors to this country in the present year of grace, a hotel guide book has been published, wherein are clearly indicated the prices charged by hotels of all descriptions, together with much neatly-tabulated information stating whether a hotel is or is not licensed to sell alcoholic beverages, if hot and cold water is laid on in the bedrooms, or a reduction is made for visitors who prefer "Continental" breakfasts, and much more in the same vein, although there is no mention—as we think there ought to be—of the date the beds were last re-made. The information is prefaced by explanatory notes printed in English, French, German, Italian and Spanish, and there are, in addition, several useful maps, one of which shows the centres of interest in England and Wales. The publication has been compiled by the Travel and Industrial Association of Great Britain and Ireland (in co-operation with the leading hotels), who are also responsible for another handy little volume headed: "1934 in Great Britain and Ireland," which details the social events of the year and gives many useful hints respecting British currency, passports, gratuities, sport, theatres, music, &c.

THE SCRAP HEAP

ECHO OF THE GREAT SNOWSTORM

The Great Western Railway announces that to repair the damage caused by the February, 1933, snowstorm in the South Wales area 2,696 miles of wire and 614 new telegraph poles were used, while a further 1,793 poles had to be straightened. Between Cardiff and Newport, where practically the whole telegraph route was destroyed, cables have now been laid.

* * *

WILD WEEK-END

A storm of snow and hail raged over most parts of Scotland at the week-end [January 16-18]. The West Highland Railway was blocked on the Moor of Rannoch, and Friday afternoon's train from Glasgow had to be dug out and shunted back to Rannoch station, where the passengers spent the night. On Saturday evening the Post Office at Turnberry was struck by lightning and utterly demolished. — *From "The Glasgow Herald" of 25 years ago.*

* * *

ENGLISH AS SHE IS WRITTEN

The following letter was recently received by Pickfords Limited (the well-known Travel Agents, of 25, High Holborn, London) from the Manager of a Rome hotel:—

Dear Sirs,—Many thanks for your interest and mention of our house, but we are very sorry to be not able to give you anyone accommodation for the Eastern Periode, because our hotel have already about two months liabilities till to 10th April and the house moore as complet.

Whole Rome is overcharged moore as any other time before for the Eastern periode and you will have much difficults to find place.

Doubtless you never find and in your interest we advise you to postpone your enterprise of travelling-party behind Eastern, if you find any harbour, to surely very spencefull and never to satifacting your sharers.

Whenever you delay your arrive till to 10th April, with great pleasure we shall offre you on very advantageous forfait and help you to shelter thedivers other parties. Certainly your representative would you tell the same of these difficulties to find lodging, between already the whole month of March is in all parts of the hotels in Rome overcharged.

Hoping to read you of yours delaying, believe us yours very faithfully

* * *

A white ptarmigan alighted on the running board of the locomotive of a Canadian National Railways train travelling recently between Hudson Bay Junction, Saskatchewan and The Pas, Manitoba. For miles, it stayed there undisturbed by occasional shrieks of the whistle and the frequent clanging of the warning bell which all Canadian engines carry. At last, seeing that the bird was beginning to feel the combined effects of winter wind and the engine's speed the driver lifted it into the cab where it remained until Dauphin was reached, 200 miles from the place where the ptarmigan joined the train. Even then, though black with grime, the feathered passenger made no effort to leave the cab, so the engine driver took it to his home.

* * *

That initiative and enterprise in surmounting obstacles in the way of attracting and carrying traffic is no new development upon the part of the railways is demonstrated by a study of the Liskeard & Caradon Railway Company. This little-known railway was incorporated in 1843, with powers to construct a line from Lamellion Bridge (near to what is now Coombe Junction) to Tokenbury Corner, with a branch from Crow's Nest to Cheesewring. By the Liskeard and Caradon (Amendments) Act, 1847, free allowance for passengers' luggage was fixed at 100, 60 and 40 lb. for first, second and third class passengers, respectively. The line was never, in fact, passed by the Board of Trade for the carriage of passengers.

The lack of this little formality did not prevent the Caradon Company from carrying passengers. Steadfast to the most up-to-date railway methods, the company made every endeavour, by advertising the places of interest on its route, to encourage the use of its line by holiday makers. The method adopted of overcoming the difficulty presented by its Act of Parliament was to make passengers pay for the convenience of carrying their hats, sticks or umbrellas. The conveyance of their bodies was thrown in by the issue of free passes to all and sundry.

Not only did the company employ this ingenious, if illegal, method of obtaining revenue, but it also exhibited a large notice board at Tokenbury Corner advertising the conditions under which free passes were granted. As by 1886 the condition of the permanent way had become too perilous to admit of its continuance, the practice was allowed to fall into disuse. The original notice board, one of the original posters, and a free pass are included in the Great Western Company's collection of railway relics.—*From "The Financial Times."*

* * *

WHERE THE RAILWAYS SCORE

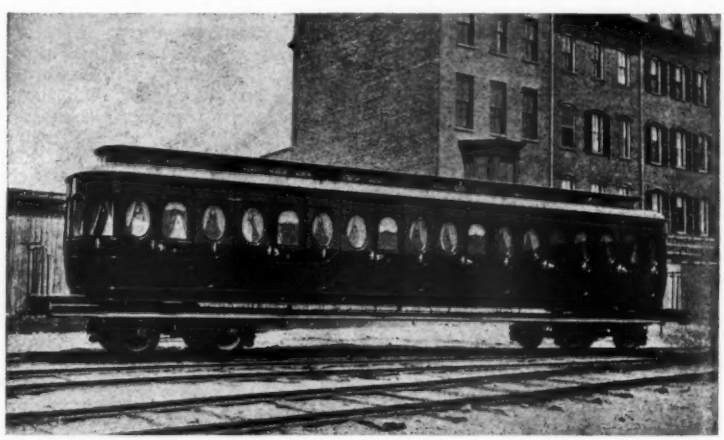
Explaining why he prefers to travel by train, a writer in the *Canadian National Railways Magazine* gives, among other reasons, that no engine-driver has yet asked him to leave a comfortable seat to help him to replace a flat tyre!

* * *

French people are less patient about official bungling than English people. Because the departure of trains from Persan-Beaumont, a suburb of Paris, was unduly delayed, a crowd of about 500 passengers demonstrated noisily at the station. Several of them were arrested, states a Reuters message.

* * *

The strangest luggage ever handled by a railway porter in Melbourne belonged to Miss Mary Fuller, a Sydney University girl, who stepped out of a train with two suit cases full of flies. She had just arrived from Western Australia and is taking her strange luggage to Canberra after four months of research into the pest which causes millions of pounds worth of damage to Australian sheep flocks each year. Miss Fuller is elated because she has discovered an entirely new species of fly with a "beautiful metallic abdomen," but she refuses point-blank to have it called after her—even in Latin. —*A press message from Australia.*



So-called "European carriage" used by the Boston & Providence Railroad between 1868 and 1878 on the Stonington line. The view was taken in the Boston yards of that railroad. Eventually the wheels of the carriage were removed, and it ended its days as a refreshment room at Oakland Beach, Rhode Island. We comment editorially on the experiment on p. 122

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

Railway exhibits in New Zealand procession—German State Railway reorganisation—Argentine harvest prospects—Buenos Aires-London by air—Indian goods rating—Staff re-arrangement and accident statistics in South Africa—French contracts' commission and new electric locomotives and steel coaches—New lines in China

NEW ZEALAND

Railway Publicity

The greatest procession ever seen in Wellington, the capital, was the Industrial Procession on November 22 last, organised by the National-Confidence Carnival Committee, of which Mr. G. G. Stewart, Publicity Manager of the N.Z. Government Railways, was Chairman. To catch the public in its most receptive mood is the aim of the publicity expert, and the railways, in their battle for a place in the sun, often have to adopt novel expedients. Recognising this, the N.Z. Railways entered an exhibit of 15 floats which graphically depicted the development of railway transport and the activities of each main branch of the railway service. Photographs of some of the principal floats are reproduced on page 137. The railway section of the procession was most impressive and proved a very effective method of advertising to the hundred thousand spectators not only the general value of railways to the country, but also the principal tourist resorts to which the railways give such convenient access.

New Type Signal Gantry

A new type of railway signal gantry, the first to be installed in New Zealand, has been erected at the Whangarei station to replace an old wooden structure, which carried the three automatic signal units. The gantry was designed by the signal engineering staff, Wellington, and was built in the railway workshops. Channel steel was used in its construction, and it has been erected in three pieces, two uprights and one cross member. The structure is for the most part welded, and only 20 bolts were used in its erection. The span measures 41 ft. 6 in. inside between the uprights or 43 ft. 6 in. over all, and is 14 ft. 6 in. high above rail level. It is believed that this type of gantry is unique. There are other types of steel gantry in different parts of the world, but they are mostly of the lattice type.

Wellington New Station

The Fletcher Construction Company, a New Zealand firm operating on a large scale, has secured the contract for the construction of the new Wellington railway station. The price tendered by this company was £339,173, and the architect's estimate was £338,000. The work is to be commenced almost immediately, and must be completed within three years and three months of the date of the commencement of the contract. The new station will occupy the area bounded on the west by Featherston Street, on the south by Bunny Street, and on the east by Waterloo Quay, and was illustrated on page 695 in the issue of THE RAILWAY GAZETTE of November 10 last. It will be set well back from the street frontage, and a plaza will be formed in front of the station. The trams will circulate round this plaza, and it will also be used as the arrival and departure space for buses. The centre portion will probably be paved and finished with grass plots at the sides. This open space will give a dignified setting to the station, and so impress visitors on arrival in the city by train or steamer.

GERMANY

Hoellental (Black Forest) Railway

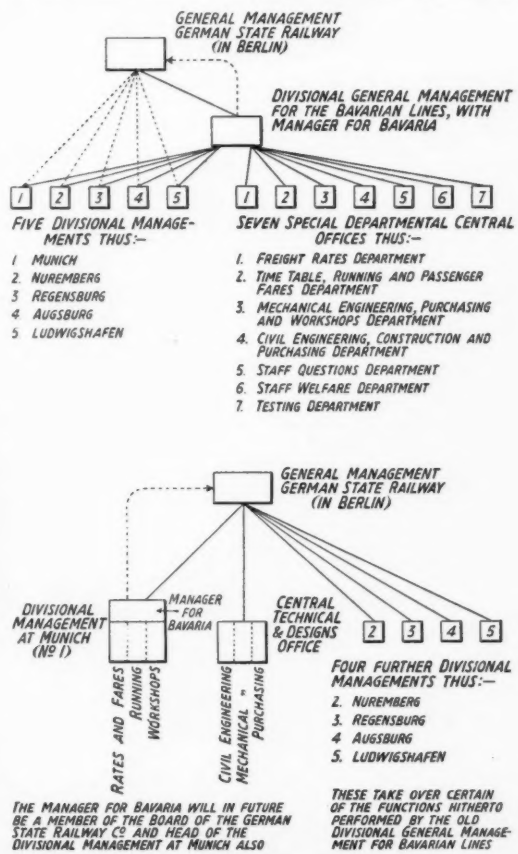
The rack system of traction on this line has recently been replaced by adhesion traction although there is a 5-mile gradient at 1 in 18. Certain trains have been accelerated to cover the 19 miles in 40 minutes.

Railway Exhibition at Berlin

At the suggestion of the German State Railway and of the Association of German Car Builders, which includes nearly all the firms at present supplying the State Railway, a technical railway exhibition will probably be held in the exhibition grounds at the Berlin wireless station in March or April.

Reorganisation of Bavarian System

We reproduce a diagram, taken from the official journal *Die Reichsbahn*, showing the new organisation which has been decided upon for those parts of the German State Railway which formerly constituted the Bavarian State system, and which, until the creation of the Deutsche Reichsbahn after the war, possessed very distinctive characteristics in many respects. The change was completed by the end of last year. As will be seen from the diagram, the effect of the scheme is to eliminate the separate management formerly existing at Munich—with the divided subordination of the various districts to it and to the General Management in Berlin—substituting for this the organisation now obtaining elsewhere in the Reich. The necessity for such a step has become increasingly evident since the German railways were amalgamated into a national and financial unit. Indeed, the divisional managements in Bavaria are said to have expressed a wish to be placed in a position of greater responsibility and independence relative to the headquarters in Berlin. The inevitable result will be the disappearance of many things formerly peculiar to the Bavarian railways, on which even the signalling was different from that seen in the other parts of Germany. For instance, Bavaria kept the white light for "line clear" until quite recent years and another—and a very good—feature of its signalling was that the distant disc, instead of appearing on edge, formed an arm when "off" and so provided a positive indication. A further Bavarian peculiarity


GENERAL MANAGEMENT GERMAN STATE RAILWAY (IN BERLIN)
DIVISIONAL GENERAL MANAGEMENT FOR THE BAVARIAN LINES, WITH MANAGER FOR BAVARIA
1 2 3 4 5
FIVE DIVISIONAL MANAGEMENTS THUS:—
1 MUNICH
2. NUREMBERG
3 REGENSBURG
4 AUGSBURG
5 LUDWIGSHAFEN
1 2 3 4 5 6 7
SEVEN SPECIAL DEPARTMENTAL CENTRAL OFFICES THUS:—
1. FREIGHT RATES DEPARTMENT
2. TIME TABLE, RUNNING AND PASSENGER FARES DEPARTMENT
3. MECHANICAL ENGINEERING, PURCHASING AND WORKSHOPS DEPARTMENT
4. CIVIL ENGINEERING, CONSTRUCTION AND PURCHASING DEPARTMENT
5. STAFF QUESTIONS DEPARTMENT
6. STAFF WELFARE DEPARTMENT
7. TESTING DEPARTMENT
GENERAL MANAGEMENT GERMAN STATE RAILWAY (IN BERLIN)
DIVISIONAL MANAGEMENT AT MUNICH (No 1)
MANAGER FOR BAVARIA
CENTRAL TECHNICAL & DESIGNS OFFICE
2 3 4 5
FOUR FURTHER DIVISIONAL MANAGEMENTS THUS:—
2. NUREMBERG
3. REGENSBURG
4 AUGSBURG
5. LUDWIGSHAFEN
RATES AND FARES
RUNNING
WORKSHOPS
CIVIL ENGINEERING
MECHANICAL "
PURCHASING
THE MANAGER FOR BAVARIA WILL IN FUTURE BE A MEMBER OF THE BOARD OF THE GERMAN STATE RAILWAY Co AND HEAD OF THE DIVISIONAL MANAGEMENT AT MUNICH ALSO
THESE TAKE OVER CERTAIN OF THE FUNCTIONS HITHERTO PERFORMED BY THE OLD DIVISIONAL GENERAL MANAGEMENT FOR BAVARIAN LINES

Administrative chart showing reorganisation of German State Railway

was the normal position of the starting signal at "Ruhe" (closed, or neutral) with the arm vertically downwards and a blue light, indicating that no train was expected on the line to which it applied. The point indicators, too, were different from the North German type, but all these interesting differences will now begin to disappear.

Railway Air Service

The German State Railway Company inaugurated its first air service from Berlin to Königsberg in East Prussia on November 1 last. This service, which is operated daily, is worked by the Deutsche Lufthansa.

ARGENTINA

Harvest Statistics: First Official Crop Estimates

The first report issued by the Argentine Ministry of Agriculture in regard to the 1933-34 harvest, estimates the probable production of wheat, linseed, oats and barley as follows: Wheat 6,972,000 tons, linseed 1,337,000 tons, oats 844,000 tons and barley 770,000 tons.

According to the foregoing figures, the wheat crop will be the highest since 1928-29, and has been exceeded only twice during the last 10 years. On the other hand, the figures relating to linseed show a reduction of 118,000 tons as compared with last year's yield, which was below that of the previous season. Oats show a decrease of 166,000 tons as compared with last year's figures; while the barley crop is estimated at 70,000 tons higher than in the previous year. It should be remembered, however, that the above figures merely represent a preliminary forecast, and are therefore liable to modification in the next estimates.

The Central Argentine Railway Wins a Long-standing Lawsuit

After the lapse of 36 years, the Central Argentine Railway is to receive from the National Government a sum amounting to $1,200,000 paper in compensation for loss of traffic and other damages sustained by the compulsory transfer of its Buenos Aires terminus (known as the Central station, and the property of the B.A. & Ensenada Railway) from its original site to the present one at Retiro in 1897, by a Government decree dated February 18 of that year. In 1909, the Supreme Court declared this decree to be illegal on the grounds that the matter should have been the subject of special legislation passed by Congress, and the Government was therefore held to be responsible for the prejudice caused to the railway's interests. After failing to obtain compensation from the Government, the railway company appealed to the courts, claiming damages to the amount of $14,631,000 paper, partly as an indemnity for the value of the line (over a mile long) between the two sites, which had to be taken up by order of the Government; and partly to cover the loss of passenger and goods traffic; also taking into consideration the fact that the Government had thereby obtained possession of a piece of land in the centre of the city valued in 1913 at $3,460,000 gold and probably worth at least three times that figure to-day. The Government considered the railway's claim to be excessive, however, and the Federal Court, apparently taking the same view, limited the amount of compensation due to the railway at $37,000 gold plus interest, but without costs. The case was then taken to the Supreme Court, which recalled its previous ruling in regard to the illegality of the Government's action and its responsibility for the damage thereby sustained by the railway, the decrease in the number of passengers carried, owing to the removal of the terminus to a less convenient site, being estimated at nearly $800,000 per annum. The Supreme Court, by a majority of 3 votes to 1, finally fixed the amount due to the railway at the figure stated, viz., $1,200,000 paper, taking into consideration the loss suffered by the company and the fact that the Government's action in the matter, although illegal, was based on the wish to benefit the city generally.

Institute of Transport (Argentine and River Plate Centre)

At a meeting of the above centre, held in Buenos Aires on December 1, presided over by the Chairman of the Centre, Mr. F. L. Creswell (Chief Engineer, B.A.G.S. Railway), Mr. M. F. Ryan (General Manager, B.A. & Pacific Railway) gave an interesting lecture on his recent trip to and from Europe by the *Graf Zeppelin*. After describing the structure and mechanism of the airship, Mr. Ryan entertained the large audience with a graphic account of the trip in both directions. The lecturer said that he left Buenos Aires on the morning of June 6, and arrived in London on the evening of June 14, five days and four nights being spent on the Zeppelin, three days in aeroplanes and one day and four nights ashore. The first stage of the journey was by aeroplane from Buenos Aires to Rio de Janeiro, and occupied two days. The last lap, of 11 hours' duration, was also by aeroplane from Friedrichshafen to London, changing machines at Frankfort and Cologne. The return journey was much faster than the homeward trip. Leaving London on the morning of October 13 by aeroplane via Paris to Zurich, and thence by motor car, Friedrichshafen was reached the same evening. The start from Friedrichshafen was made the next evening (October 14). On the following Tuesday morning (60 hours after leaving Friedrichshafen) Pernambuco in Brazil was reached, and the passengers landed. Two hours later the final stage of the journey was commenced by seaplane to Buenos Aires, which was reached shortly after midday on Thursday, October 19. The entire journey from London took just over six days, and would have occupied one day less but for the long wait at Friedrichshafen.

INDIA

Restriction of Coal Output

It is understood that the Indian and European colliery owners have agreed upon a scheme of restriction of output in order to bring about some improvement in the price of coal. The scheme is being forwarded to the Government of India for necessary legislation. It is proposed that the restriction shall be operative through the control of railway wagons.

Vizagapatam Harbour Opened

The Viceroy formally opened Vizagapatam Harbour on December 19* in the presence of a distinguished assembly. Mr. C. P. Colvin, Member of the Railway Board, was present on the occasion on behalf of the Board. After Mr. Ash, Engineer-in-Chief of the harbour works, had described the construction operations, His Excellency complimented the Bengal-Nagpur Railway on its enterprise in providing, by means of the Raipur-Vizianagram line, the necessary land communication for the great new port.

Classification of Goods

In considering the claim for protection of certain heavy chemicals, the Indian Tariff Board made some observations on the general principles on which the railway rates structure was founded. These were considered by the Commercial Committee of the Indian Railway Conference Association. The committee recognised that there were anomalies in the present classification but considered that before proceeding to examine in detail any departure from the present rating structure, it was necessary to obtain from the Government of India an indication as to whether any, and if so, what changes in the existing rating policy were contemplated. The committee suggested a re-classification of chemicals which would remove the anomalies referred to by the Tariff Board.

The question of a general revision of the goods classification has been on the anvil for many years. It is generally agreed that the existing classification requires simplification. Last year, the Indian Railway Conference Association stressed the urgency of a change in the classification but expressed the opinion that the initiative should be taken by the Railway Board. The Board, however, stated that the present time when trade conditions were so unsettled, was distinctly unsuited for a change involving matters of policy. It invited the opinion of the Conference on certain points which would come up for decision when a revision of the classification was later embarked upon. So far, the Commercial Committee has been unable to reconcile the conflicting opinions held by the different railways on these points and it was decided at the Conference meeting last October that a whole-time advisory committee

* As reported in the news columns of THE RAILWAY GAZETTE, of December 29.—ED. *R.G.*

of senior traffic officers should be appointed at once to decide what information should be obtained and what statistics collected before the revision was undertaken. There was, however, an influential minority in favour of pressing the Railway Board to take immediate action.

Train Derailed by Cyclone

A severe cyclone passed over the Madras Presidency on December 16 causing much damage. A train was blown off the rails near Chidambaram station (S.I.R.) resulting in the death of 28 persons. Breaches also occurred at several places and brought about considerable dislocation of railway communication for a few days.

CHILE AND PERU

Chilean State Railways' Budget for 1934

According to information from Chile, the State Railways' financial estimates for the coming year amount to 250,000,000 Chilean dollars. This figure is an increase of 30,000,000 dollars over the previous year, due principally to the higher salaries and wages recently granted to all grades of the service.

Proposed Bayovar—Yurimaguas Railway (Peru)

Advices from Lima are to the effect that the local agent of the American firm of railway contractors, W. R. Davis & Co., has informed the Peruvian Government that his company is ready to commence the construction of the projected railway to connect the Pacific port of Bayovar with Yurimaguas in the interior of Peru. It is stated that the Government has appointed a special commission to study and report on the scheme.

SOUTH AFRICA

Serious Derailment

The second of two engines and ten coaches of a train travelling to Durban left the rails and crashed down a 10-ft. embankment near Thaba Nchu on December 15. One of the derailed coaches fell 15 ft. from a bridge into the spruit beneath. There was only one fatality among the 200 passengers, although few of them escaped without bruises or severe shock. The cause of the derailment is unknown, though it is surmised that the vehicles left the rails because of the line subsiding owing to the heavy rains.

Railway Accidents

During the year ended March 31, 1933, the number of casualties among members of the public from all causes connected with the railway and harbour working totalled 277, representing 140 people killed and 137 injured. As the direct result of accidents to trains, however, the numbers of casualties were comparatively few. Altogether 70 million passenger journeys were undertaken by the public during the year and not a single person was killed and only 20 were injured. The 140 people killed are made up of 10 deaths due to accidents as the result of neglect of caution, 34 level crossing accidents, 64 trespassers, 13 suicides, while 19 fatalities are shown under the heading of miscellaneous.

Chief Traffic Manager

Important staff changes affecting all the Union's railway systems and entailing the creation of what is practically a new post, have recently been approved by the Administration. Mr. H. Cheadle, System Manager, Pretoria, is to become Chief Traffic Manager, with headquarters at Johannesburg. This is not actually a new post, as the last incumbent was the late Sir William Hoy, who was both General Manager and Chief Traffic Manager. On the latter's retirement the post was declared redundant, and its revival is considered advisable as an important step in the direction of co-ordinating and controlling the Union's traffic to the best possible advantage.

FRANCE

Government Control of Contracts

The Ministry of Public Works has appointed a commission to examine all contracts of the railways in excess of 50,000 francs and also all drafts for payments or receipts of sums of more than 5,000 francs annually, as stipulated by the Railway Law of July 6, 1933. The commission may delegate to sub-committees of three members the power to examine contracts of between 50,000 and 200,000 francs. The commission must give a favourable or unfavourable opinion on each contract. If unfavourable, the reasons for such an opinion must be furnished. The opinion of the commission must be notified within three days to the *Comité de Direction*, or managing committee of the railway systems, when the contract concerns several railways, or to the system concerned when it applies to only one railway. It must also be communicated to the Minister of Public Works. In default of notification within fifteen days after a contract has been communicated to the commission, the opinion of the commission will be considered as favourable. In case of an unfavourable opinion, the railway managing committees may bring the matter before the Minister of Public Works. The Minister must give his decision within eight days, but after the lapse of that time he must be regarded as sharing the opinion of the commission. For contracts requiring an urgent decision a special procedure is to be instituted.

Orders for New Rolling Stock

The Paris-Orleans Company has given a joint order for ten electric locomotives to the Compagnie Electro-Mécanique and the Compagnie de Fives-Lille. These locomotives are of the type 2-D-2 of 4,000 h.p. for express trains. In 1931 an order for 25 locomotives of the same type was given to the same builders.

Contracts for the forty new main line steel coaches for the State Railways will shortly be distributed as follow: fifteen to the Enterprise Industrielle Charentaise; eleven to the Etablissements Carel-Fouché; fourteen to the Société Industrielle de Bacalan. The coaches will be of the O.C.E.M. (Office Central d'Etudes de Materiel) type with reinforced ends. The first two of the above-named firms will also receive the contracts for building 40 double-deck steel coaches for the State suburban lines, an order for 25 going to the Industrielle Charentaise and another for fifteen to the Carel-Fouché. The bogies will be supplied by the Société des Chantiers et Ateliers de la Loire.

Banana Traffic

The traffic in bananas has increased enormously in many European countries in the last 20 years, encouraged by the propaganda carried out on its behalf. It was estimated to amount to nearly 2,000,000 tons in 1932, of which France took 225,000. In 1913 the tonnage handled in France was only 35,000. The principal ports in France for the banana trade are Dieppe, Nantes, Havre, Rouen, Bordeaux, Marseilles, and Dunkerque. Havre now handles a good deal of traffic which once passed through Rotterdam. About 23,000 loaded wagons were despatched from the State Railways' port stations in 1932.

FAR EAST

Railway Development in Shansi

The Shansi (China) Provincial authorities hope to operate a service early in 1934 on the Taiyuan-Kiehsiu section of the Tatung-Pukow Railway, as engineering work on that section is nearing completion. For the purpose of training officers for railway administration, the Provincial Government has decided to establish a railway training school. Altogether 500 students will be admitted; a number being trained as telegraph operators and others as stationmasters.

Hangchow-Kiangshan Railway

This railway was to have been opened for traffic throughout its entire length in December, construction having been completed at a cost of $14,000,000. One section previously opened has been earning $120,000 monthly and showing a net profit of $40,000. Kiangshan, the terminus of the complete line, is situated near the Chekiang-Kiangsi border.

A tender for the construction of a new branch of the Lung-Hai Railway, running along the Shantung-Kiangsu border from Taierhchwang to Chaoteng, has now been accepted, and construction is to start upon two sections simultaneously in the near future, says the Chinese Economic Bulletin of November 25, 1933.

NEW CHAIR FASTENING FOR B.S. TRACK

A screw-spike which eliminates the necessity for a wooden ferrule

NO component, unless it be the joint, has caused more concern to engineers than the chair fastenings. This is natural, as a consideration of the details and circumstances in conjunction with actual experience single it out as one of the weakest links in the assembly which goes to make up the British bull-head type of railway track. Each chair in the course of its lifetime has to sustain an innumerable succession of violent stresses approaching in intensity to blows. It follows inevitably that, if at any point, there is room for play in the parts, no matter how infinitesimal, this will gradually increase. For a more or less short time after the chair has been attached to the sleeper the downward grip of the chair fastenings, together with the wheel load, cause sufficient friction at the chair seat to suppress any noticeable horizontal movement. But the repeated applications of the wheel load sooner or later cause the chair and sleeper to sit closer together, especially if felt pads are used, and the downward grip of the chair fastenings disappears leaving the stability of the track dependent on the shearing resistance of the fastening. The effect is augmented by the progressive loss of the resilient properties of the sleeper itself. This accounts for the unsatisfactoriness of the old chair spike. For practical

Improved chair screw spike for B.S. track

reasons it is not possible to use a spike which fits the hole in the chair tightly. The clearance may be minute to begin with, but a simple calculation will show that if after 100,000 axles have passed over any chair, the play is increased by only one-thousandth of an inch, the gauge will be half an inch wide in, say, 10 years time. In the case of the old spike this play appeared as wear at the neck of the spike or an enlargement of the hole in the sleeper or both. With this difficulty in view the wooden trenail, used in conjunction with the spike, was adopted, which it was hoped, by tightly fitting the hole in the chair, would prevent horizontal movement. Unfortunately, the material of the trenail did not possess sufficient strength to resist the shearing forces and, though it checked it, could not eliminate the old trouble.

With the introduction of the British Standard track some ten years ago an improvement was made by combining the strength of the spike and the resistance of the trenail in the form of the familiar screw and ferrule which at the same time provide the superior advantages of a fastening which is screwed and not merely hammered into the sleeper. But this fastening also is not providing quite all that was hoped from it. The ferrule, for the work it has to do, is a very slender piece of wood, and it is almost, if not quite, a manufacturing impossibility to keep all the ferrules within the narrow limits of shape and size which are necessary to give just the right amount of compression without destroying the resilience of the wood. Moreover, even a perfectly fitting ferrule, by its very nature, will allow more of a bending action and less of a pure shear to take effect upon the screw it surrounds, and the latter tends to become canted outwards by the consequent elongation of the upper part of the hole in the sleeper.

With these drawbacks in view, an improved screw spike has been designed which is illustrated in the accompanying photographic reproduction. The conical heads fits the British Standard chair hole tightly without the interposition of any ferrule. Thus wear and bending are eliminated, and the resistance between the sleeper and the body of the screw is developed to much fuller extent than it is when, by reason of the slight canting of the screw, the pressure is concentrated near the surface of the sleeper. Of course, the chair will still, by the action of traffic, be forced into closer contact with the sleeper, but it is only necessary to give the improved screw a nip up soon after the first traffic has gone over and again a few months later. If the latter operation is tried upon the standard ferrules, many of them will be found to have lost nearly all resistance, thus indicating the ephemeral nature of the torsional resistance to the insertion of the screw when first laid, to which some engineers have been inclined to attach a value now seemingly misplaced.

The improved screw is made in two patterns, one having the present standard diameter of shank and the other a somewhat thicker one. The latter can be employed where extra strength is desirable or, more particularly, it is intended for use instead of replacing worn-out ferrules, as the thicker screw will restore the grip in the partly-worn hole in the sleeper. The screws, the pattern of which has been registered, are manufactured by the Rivet Bolt & Nut Company, of 74, York Street, Glasgow.

In the normal size the screws are no more costly than the present standard screw and in the heavy pattern only slightly so, a saving corresponding to the cost of ferrules, which is not much less than £20 for a mile of new track, is therefore effected without taking into account the renewal of ferrules, which, at the moment, appears likely to be required at intervals of no more than 10 years.

Further experience with the improved screw may also show that the felt pad can be abandoned, which would be advantageous not only in point of cost but because it is somewhat troublesome to handle when the sleepers are chaired at site.

BOILER AND SUPERHEATER TUBES.—Following the issue in July last year of the Cold Drawn Weldless Steel Boiler and Superheater Tube Specification (B.S.S. No. 494) the British Standards Institution have now issued the following further specifications for boiler and superheater tubes:—

Hot finished weldless steel boiler and superheater tubes for designed steam temperatures not exceeding 850° F. (B.S.S. No. 512).

Lapwelded wrought-iron boiler tubes for external pressure (B.S.S. No. 527).

Lapwelded steel boiler tubes for external pressure (B.S.S. No. 528).

These specifications complete the general series of British Standard Specifications for boiler and superheater tubes which have been prepared as part of the work undertaken two years ago in connection with land boilers. Copies of these specifications (B.S.S. Nos. 512, 527 and 528—1934) can be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1, price 2s. 2d. each post free.

STEAM LOCOMOTIVES FOR HIGH-SPEED SERVICE IN GERMANY

Two streamlined 4-6-4 heavy-express locomotives and a 4-4-2 light-train locomotive for speeds up to about 100 m.p.h. Designed by Henschel & Sohn, Kassel

AMONG the special types of high-speed railcars which have hitherto been built in Germany, as a contribution to the attainment of higher average speeds on railways, and to meet the changed conditions brought about by progress in road and air transport, particular interest has been aroused by the Flying Hamburger, the Krukenberg rail Zeppelin, and the Micheline light-metal car. In each of these vehicles the driving power is provided by internal-combustion engines and, in some quarters, it has been more or less tacitly assumed that this type of engine is essential to the realisation of high speeds in railcar and train service. Evidence that this is by no means the case is to be found in the remarkable forms of construction shown in the accompanying illustrations, which relate respectively to designs for a 4-6-4 four-cylinder compound, superheated, express locomotive capable of 150 km. (93·2 miles) an hour, and for a light steam train to run at speeds up to 160 km. (99·4 miles) an hour.

These designs have been developed by Henschel & Sohn A.G., Kassel, to whom we are indebted for permission to reproduce the accompanying illustrations. This firm has devoted continual attention to the correlated problems of reductions in weight, streamlining, and improvements in propulsion tending to the economic maintenance of high speeds. In this connection, it may be recalled that a Henschel locomotive built as long ago as 1904 attained a maximum speed of 155 km. (96·3 miles) an hour hauling a train of 160 metric tons (157½ tons) on the Spandau-Hannover track. This performance was the more creditable as the principles of streamlining were then imperfectly understood. There was, however, no commercial need for such speeds at that time.

Streamlined Steam Locomotives

Under existing conditions, higher railway speeds have become a necessity and, in recognition of this fact, the German State Railway recently invited certain German builders to submit designs for express locomotives capable of hauling trains of 250 metric tons (246 tons) at a speed of 150 km. (93·2 miles) an hour. Two designs were prepared by the Henschel firm, the first (Fig. 1) for a 4-6-4 express locomotive of normal construction except that the projecting parts are enclosed by streamlined casings to reduce air resistance; the second (Fig. 2) providing for the streamline enclosure of the whole locomotive and tender. In the second case, the driver's cab is placed in front to give a better view of the track, and this arrangement involves placing the firebox at the front of the boiler and using oil fuel.

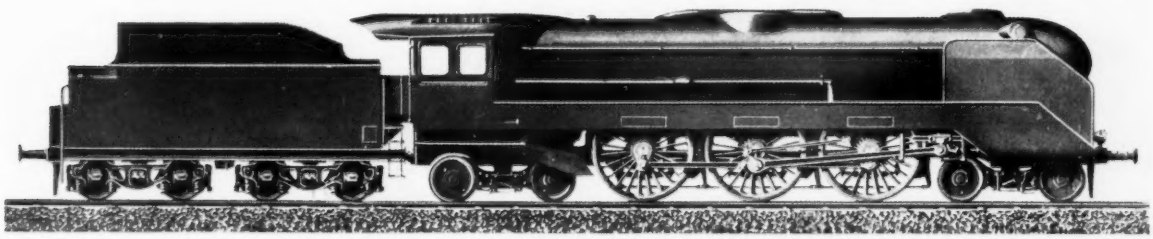


Fig. 1—Design for a 4-6-4 four-cylinder compound express locomotive prepared by Henschel & Sohn A.G., Kassel, for the German State Railway. This partially streamlined locomotive is intended to haul a 246-ton train at 93 m.p.h.

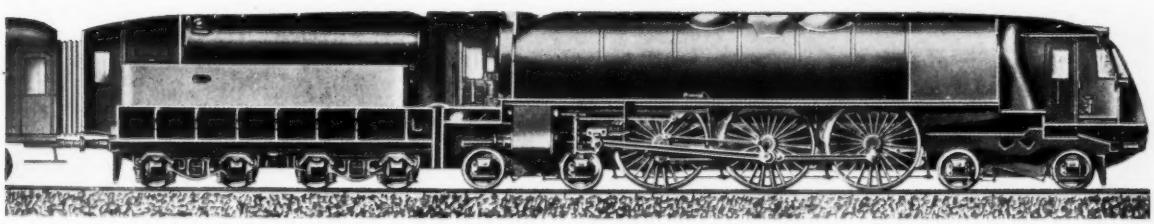


Fig. 2—Alternative design for express locomotive. The distinctive features in this case are the complete streamline enclosure of the locomotive and tender, the leading cab and firebox, and the use of oil firing

The speeds attained by the diesel-electric high-speed railcar on the Berlin-Hamburg line can be obtained quite economically by a light steam train. Thus, the 4-6-2 express locomotive, Series 03 of the German State Railway, has repeatedly hauled a three-coach train on the Berlin-Hamburg route with only 10 minutes extra journey time, compared with the schedule of the Flying Hamburger. For maximum economy in such steam service, however, a special construction of locomotive and coaches is required, retaining as far as possible the simple and well-proved components of ordinary locomotive practice. Acting on this principle, the Henschel firm designed the high-

speed train shown in Figs. 3 and 4, consisting of a 4-4-2 tank locomotive, itself streamlined and close-coupled to two streamlined coaches. This train is intended for speeds up to 160 km. (99·4 miles) an hour and, as will be seen from Fig. 4, the wheel arrangement comprises a four-wheeled bogie of long wheelbase, four-coupled driving wheels of 2,300 mm. (7 ft. 6½ in.) diameter, and trailing wheels capable of radial displacement. With a boiler steam pressure of 20 atmos. (284 lb. per sq. in.), the cylinders can be placed inside the frames, driving on to the cranked leading driving axle. This arrangement reduces the nosing motion due to unbalanced reciprocating masses and conduces to steady running at high speeds. Inspection doors are provided to give access to the articulated coach; and the extended streamline sheathing at the rear of the locomotive covers the nose of the adjoining coach, thus reducing air resistance to a minimum. This device enables the locomotive to be used at either end of the double coach without affecting the aerodynamic form of the assembled train.

The double coach is mounted on four-wheeled bogies at each end, with a Jacobs bogie at the centre. It provides seating accommodation for 124 second-class passengers and contains, also, a refreshment compartment and a luggage compartment. The weight of the locomotive in running order is about 90 metric tons (88 tons 12 cwt.) of which 40 metric tons (39 tons 7 cwt.) is adhesive; the weight of the double coach is 65 metric tons (63 tons 19 cwt.)

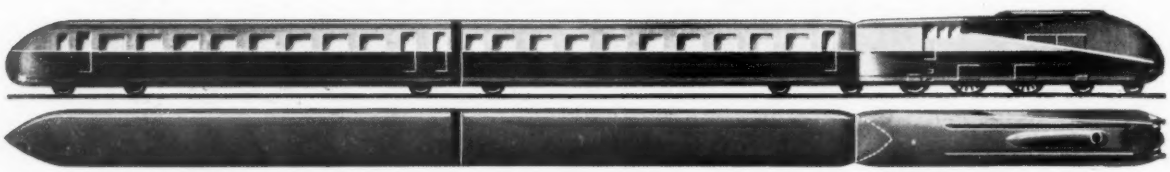


Fig. 3—Light train comprising streamlined steam locomotive and double coach, designed by Henschel & Sohn A.G., Kassel. The locomotive can be used at either end, and is intended for speeds up to 100 m.p.h.

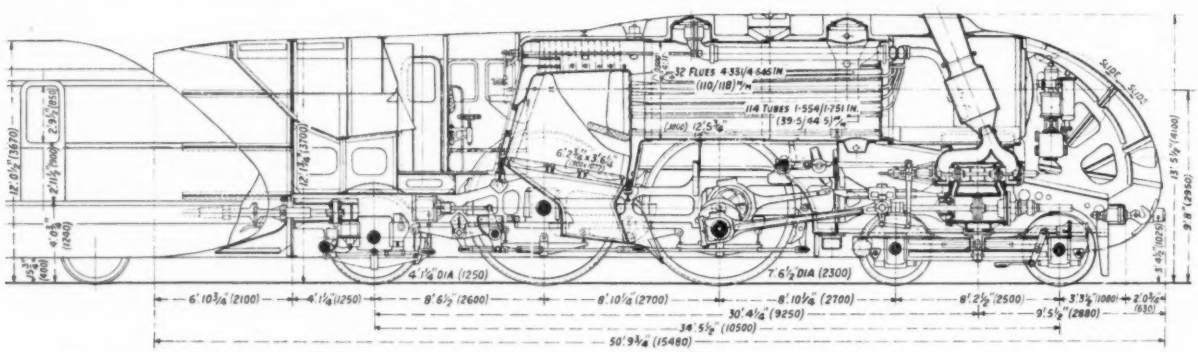


Fig. 4—Sectional view of streamlined tank locomotive with inside cylinders and 7 ft. 6½ in. diameter coupled wheels for high-speed service

motion work and valve gear. Water is carried partly in low-mounted side tanks, the covers of which are sloped downwards to provide a clear view of the track, and partly in a tank beneath the coal bunker.

Automatic coupling gear, with brake and heating connections, is used between the locomotive and the double and the water and coal carried suffice for 3 hours' running at about 140 km. (87 miles) per hour.

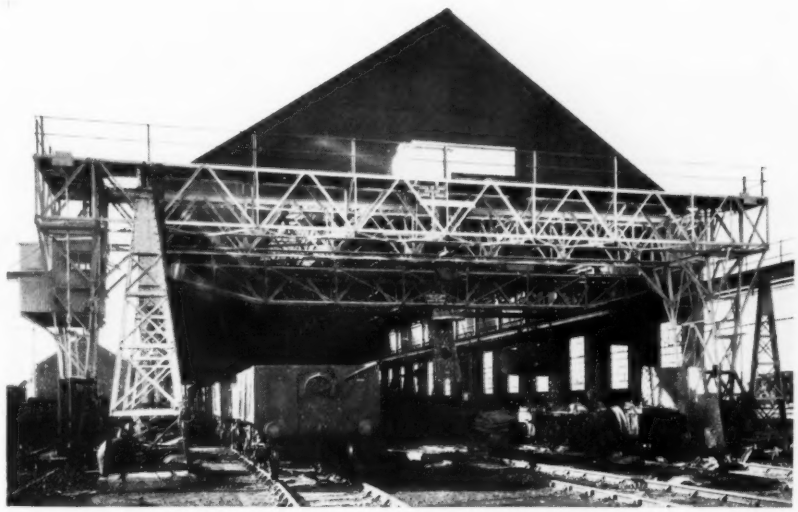
The above information was prepared by Herr Direktor Karl Imfeld and placed at our disposal by Henschel & Sohn A.G., Kassel, for exclusive British publication in the columns of THE RAILWAY GAZETTE.

THE INDIAN EARTHQUAKE.—Much damage has been done in Behar by the earthquake. Relief measures are in full swing, railway and other repair works are being pressed forward, and the Sappers and Miners (R.E.'s) are being employed upon demolition work. On the East Indian Railway, south of the Ganges, damage appears to be confined mainly to buildings, and Patna is now again in communication with Mazaffarpur via Samastipur. At Jamalpur, however, the cost of repairs to the workshops and other structures is estimated at about £40,000, apparently. The position on the Bengal & North Western, which also works the Tirhut State Railway, was referred to by Sir Henry Burt, Chairman of the company, at the ordinary general meeting on Tuesday, reported on p. 145. The illustration alongside shows typical damage by earthquake to a railway bridge in Burma, and at least one large bridge in Tirhut has now shared the same fate

HANDLING RAILWAY SCRAP

An up-to-date scrap concentration yard has recently been installed at the Swindon works of the Great Western Railway

IT will be appreciated that in an establishment such as the Great Western Railway works at Swindon there must be an enormous quantity of material which is eventually scrapped and has to be disposed of to the best advantage, principal amongst this being, of course, the various locomotives, boilers and tenders which are condemned for further service. With the growth of the works the actual handling of the scrap was dealt with either in the production shops principally concerned or on ground readily accessible to such shops, but in the course of time the quantity of material involved became so large that some central system became necessary for dealing with the scrap systematically and economically.

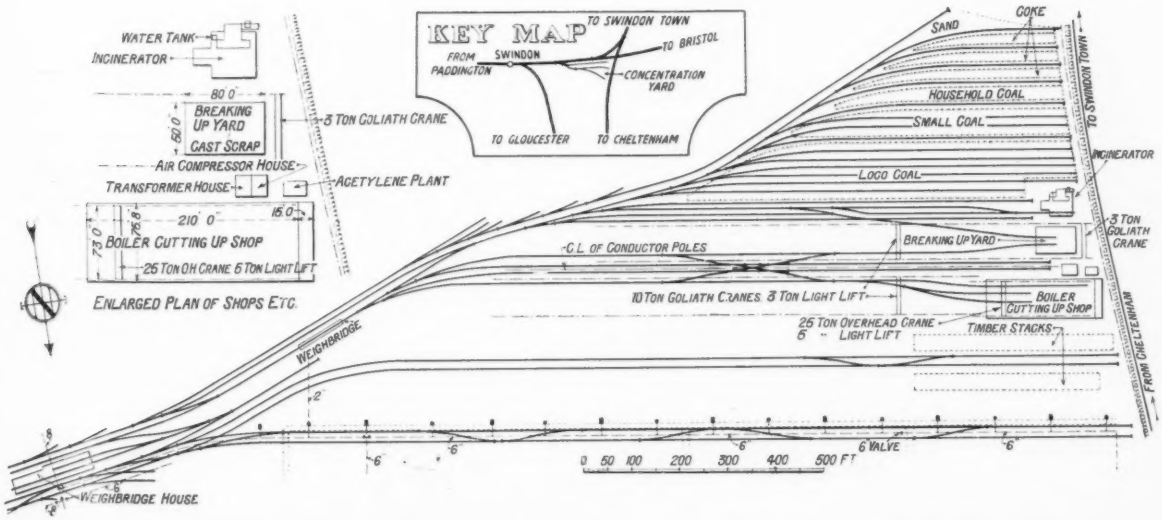


Scrap concentration yard shop with machinery for cutting, rolling and lifting

A site was selected at the west end of the works where there was space available for providing not only a suitable covered shop for the actual cutting up of the various items, but also convenient yard space where the various classes of scrap could be handled conveniently and stored pending use again or sale. This centralisation makes possible the extensive use of oxy-jet cutting from points served by pipelines supplying both oxygen and acetylene, thus considerably reducing labour costs for transport of bottles and portable plants, as well as obviating the stripping of individual parts which was previously practised.

In considering this scheme it was realised that such a spot would also serve as a convenient centre for the storage of such materials as pig iron, sand, coal, coke, &c., a large stock of which has to be carried, although, wherever possible, arrangements are made for incoming consignments to be sent direct to the using depot.

The site selected covers approximately 10½ acres, which has been laid out with siding accommodation for handling and stacking the various classes of material. In order to provide convenient facilities for the actual cutting up of such items as engines, boilers and tenders, a covered building 210 ft. × 76 ft. 8 in. was erected at the extreme end of the yard and equipped with three shearing machines, supplied by J. Bennie, capable of shearing mild-steel plate up to ⅞ in., 1½ in. and 2 in. in thickness, the last mentioned being capable of shearing joists of the largest sizes. One set of plate-bending rolls, also supplied



Layout of the new scrap concentration yard at Swindon, G.W.R.

by J. Bennie, is utilised for levelling boiler-barrel and similar plates up to 10 ft. wide × 1 in. thick after the locomotives have been dismantled. Two two-stage air compressors, direct-coupled to electric motors, of 515 cu. ft. per min. capacity of free air, supplied by Belliss & Morcom, were installed for operating the necessary pneumatic plant. Electric power is supplied from 3,300-volt a.c. feeders through a transformer substation of 400 kVA. output at 400-volt 3-phase. There is also a separate d.c. supply from a nearby converter at 250-volt d.c. for use on the electric lifting magnet circuits.

Locomotives, boilers and tenders are dismantled in this shed and the various component parts are sheared up and levelled or, alternatively, cut by the flame in convenient sizes for handling and sale. An overhead crane of 25-tons capacity, with a light lift of 5 tons, is provided for lifting the engines, &c., inside the cutting-up shed, and this is also carried outside the shed over a certain section of the stacking yard so that it can be utilised, by means of the magnet, for bringing the scrap out and putting it on to the scrap dump outside. A yard Heywood Goliath, of 10-tons capacity with 3-tons light lift, is also provided.

Immediately adjoining the shed is a large drop ball, handled by an overhead crane for breaking up cast-iron scrap. The drop-ball yard is 80 ft. × 50 ft. surrounded by steel-plate fence 12 ft. high. Over the roads leading to the drop ball are two Goliath cranes by S. H. Heywood & Co. Ltd., of Reddish, near Stockport, one of 3-tons lift and the other of 10-tons heavy and 3-tons light lift, which are utilised for taking the large pieces of scrap to the drop ball and subsequently for bringing the scrap from the drop ball by means of the magnets and dropping it into the various heaps ready for loading into wagons for sale or for use in the foundries. Practically all the handling required in connection with the scrap depot is done mechanically, in the case of the unbroken scrap by magnets.

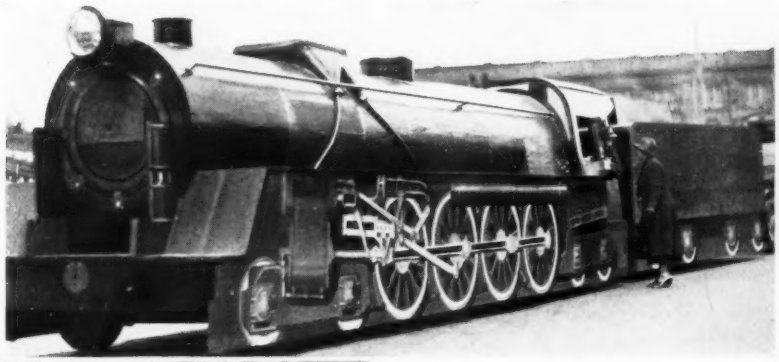
General view of scrap concentration yard at Swindon Works, G.W.R.

Federal Control of U.S. Railways

THE first report of the Federal Railway Administrator, Mr. J. B. Eastman, on the reform of the United States railways has been presented to President Roosevelt. The report extends to 350 pages. Mr. Eastman states—according to the summary published in *The Financial Times*—that the ultimate and logical solution of the financial difficulties of the United States railways is public ownership and operation. Nevertheless, he adds, the nation's financial position at present does not render the time ripe either for national consolidation of the railways or Government ownership. He recommends that his present policy of co-ordination and co-operation authorised in the Emergency Transportation Act be continued for another year before final legislative steps are taken. In the meantime it would be wise, quite apart from existing economic factors, to postpone the immediate considerations of any radical or major change in the organisation or conduct of the railway industry. The report recommends the passage of trial legislation compelling the railways to consolidate under strict Government supervision. The method proposed is the interchange of railway securities instead of cash, thus eliminating speculation. The Government should participate in the management of the consolidated systems through paid public directors selected by and attached to the office of the Federal Railroad Administrator. Later a formal request for compulsory merger legislation would be made, together with a request for the modification of the present Emergency Act, so as to remove restrictions upon a reduction of railway employment.

Mr. Eastman will submit three additional reports later covering (*a*) legislation for other forms of transportation, (*b*) the labour situation, and (*c*) needed amendment of Federal statutes to improve present railway regulations.

Railway Exhibits in Carnival Procession at Wellington, New Zealand



Right: Model float of new K class locomotive in the procession of historical pageantry of the National Confidence Carnival. (Also seen in background below)

Left: Industrial procession of the Confidence Carnival at Wellington, in November, 1933, showing some of the railway exhibits described on page 129 of this issue

B.B. & C.I. Metre-Gauge Bazaar Special

The first metre-gauge Bazaar Special run by the B.B. & C.I. Railway on a tour extending over 112 days and covering approximately 5,000 miles, from Ahmedabad to within 300 miles of Calcutta, and thence back to Indore. The exhibitors on the train are mostly big merchants of Bombay and the goods sold are almost entirely of Indian manufacture. This train, shown below and on the right, was visited at Delhi by the Viceroy and the Countess of Willingdon, who expressed themselves as being very pleased with this method of encouraging Indian trade by taking manufacturers to the doors of purchasers in various parts of the country. From the railway point of view it is also a profitable undertaking, since the total earnings amount to about Rs. 40,000

The White Star Liner "Majestic" (56,598 tons), the first to use the King George V graving dock at Southampton, entering on January 19, ship and dock both being the largest in the world. The official opening and naming of the dock by the King and Queen on July 26 last was reported in "The Railway Gazette" of July 28, since when the caisson gate has been fitted and the approach channel and swinging ground dredged to 35 ft. below low tide. The control of the 54-in. pumps for emptying the dock is by one man seated at a desk with push button controls and coloured light indications of the valves and pumps (see page 145)

RAILWAY NEWS SECTION

PERSONAL

Lieut.-Colonel T. E. Robins, D.S.O., has been elected a Director of the Rhodesia Railways Trust Limited, in place of the late Sir Francis Drummond P. Chaplin.

SOUTH AMERICAN PERSONAL MOVEMENTS.

Mr. Roger Wright, a Director of the Buenos Ayres & Pacific Railway, returned to England on December 13, after a business visit to Buenos Aires of several weeks' duration.

Señor E. Tremblay, General Manager of the Santa Fé Provincial Railway, Argentina, returned from Europe at the beginning of December and resumed his administrative duties.

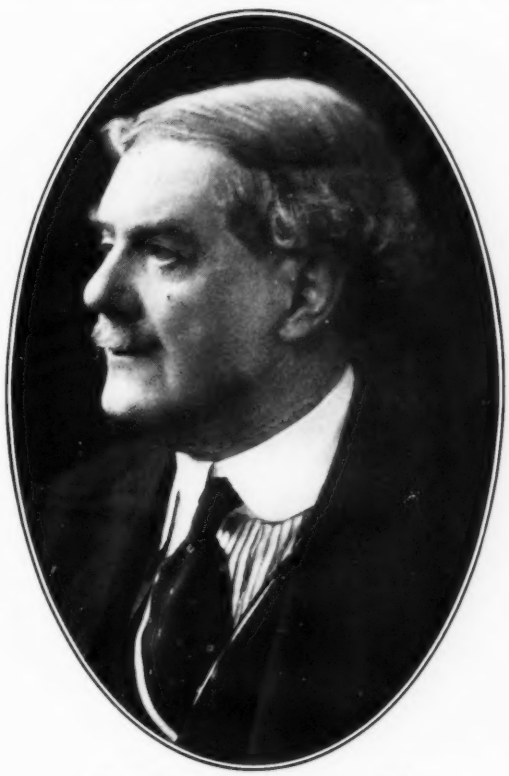
Mr. Douglas S. Martin, Assistant Traffic Manager, Central Argentine Railway, retired on pension at the end of November after 32 years' service with that railway.

Mr. J. Montague Eddy, C.B.E., a Director of the Buenos Ayres Great Southern Railway and other companies, returned to England on December 27.

We regret to record the death on January 23 of Mr. E. Worthington, late Secretary of the Institution of Mechanical Engineers.

Mr. H. E. Allwood, who, as announced in THE RAILWAY GAZETTE of November 10 last, has been appointed Chief Mechanical Engineer, Sierra Leone Railway, began his Colonial railway career on the Jamaican Government Railways, where he was attached to the Locomotive, Carriage and Wagon Department from 1921 to 1925. In the latter year he was appointed Chief Locomotive Draughtsman, Gold Coast Railways, being transferred in 1926 to a similar post on the Nigerian Railway. In 1930 he was promoted to Works Manager of the much enlarged Ebute Metta workshops, having control of both Locomotive and Carriage and Wagon sections, and held this position until selected for the post of Chief Mechanical Engineer, Sierra Leone Railway, on September 30, 1933. Prior to these Colonial appointments, Mr. Allwood was engaged with several locomotive building firms on the design and construction of locomotives, &c., for Colonial and foreign railways. He is a Member of the Institution of Locomotive Engineers.

We learn with great regret of the death on January 23 of Lord Aberconway, for many years Chairman of the Metropolitan Railway. Born in Edinburgh on May 12, 1850, Charles Benjamin Bright M'Laren was a son of Mr. Duncan M'Laren, who represented Edinburgh in Parliament from 1865 to 1881. His mother was a sister of the famous John Bright, from whom he took his third name, and his father was a half-brother of Lord M'Laren, a judge of the Court of Session. After distinguishing himself at Edinburgh University, he studied at both Heidelberg and Bonn, and was called to the Bar in 1874, taking silk in 1897, after having in the meantime practised in company cases and at the Chancery Bar. His connection with the Metropolitan Railway began in 1895, when he was elected a Director in succession to his father-in-law, the late Henry Davis Pochin. He was appointed Deputy Chairman in 1902, and on the resignation in 1904 of Colonel John James Mellor succeeded to the Chairmanship, which he held during the whole remaining life of the Metropolitan Railway as a separate entity. He was made a baronet in 1902, a Privy Councillor in 1908, and in 1911 was created Baron Aberconway of Bodnant in the county of Denbighshire. Apart from his association with the Metropolitan Railway (upon which we comment editorially on page 121) Lord Aberconway was closely identified with the iron and steel, shipbuilding, and coal-mining industries, and served on the boards of a large number of companies. He was Chairman of the Tredegar Iron & Coal Co. Ltd. continuously from 1894 until the beginning of the present year, when he resigned owing to failing health; Chairman of John Brown & Co. Ltd. from November, 1906 to 1933, having previously been Deputy Chairman for about eight years; a Director of Palmers Shipbuilding & Iron Co. Ltd., and Chairman for some years prior to 1910; a Director of the Wagon Finance Corporation; and a Director of some twelve important colliery companies. In addition he was Vice-President of the Federation of British Industries and of the British Electrical & Allied Manufacturers' Association, and in 1909 was Chairman of the British Iron Trade Association. The funeral will take place at Bodnant, North Wales, to-day (Friday) at 2 p.m. A memorial service will be held at St. Margaret's, Westminster, at 12.30 p.m. the same day.



The late Lord Aberconway, P.C.,
Chairman, Metropolitan Railway Company, 1904–33.

INDIAN RAILWAY STAFF CHANGES

Mr. G. Charlton, on return from leave, resumed his duties of Deputy Agent, M. & S.M. Railway, on December 18.

Mr. H. M. Davies, V.D., Deputy Chief Operating Superintendent, E.I.R., has been granted one year's leave as from November 6.

Mr. A. C. Robertson has been appointed Deputy Chief Mechanical Engineer, E.I.R., as from November 6.

Mr. W. Bull has been appointed to officiate as Chief Electrical Engineer, N.W.R., as from November 7.

Mr. J. H. Bavin, Deputy Auditor, has been promoted Chief Auditor A.-B. Railway, Mr. N. H. Lewis succeeding him as Deputy Auditor, with effect from December 12.

Lieut.-Colonel Sir Hassan Suhrawardy, Kt., O.B.E., M.D., F.R.C.S.I., D.P.H., L.M., L.M.S., on return from leave resumed duty as Chief Medical Officer, E.I.R., as from November 17.

Dr. W. R. Taylor, Chief Medical Officer, Burma Railways, has been granted leave for six months, as from

November 24, and Dr. P. L. C. Carrier has been appointed to officiate in his stead.

We regret to record the death, on January 16, of Mr. Frank Horace Frere, District Engineer, Derby South District, L.M.S.R., at the age of 64. Mr. Frere was educated at Haileybury and King's College, London. In 1889 he became a pupil of the late Sir Douglas Fox, and was employed on the Liverpool Overhead Railway. Five years later he was engaged upon the Great Central Railway extension to London, joining the Midland Railway as Resident Engineer New Works in 1899. Appointed Chief Assistant for New Works in 1905, he supervised the following engineering works:—The Trent and Toton lines, the Erewash Valley widening, Nottingham widening and new station, Hotwells to Avonmouth widening, and reconstruction of the three river spans of Trent Viaduct. In 1909, Mr. Frere was appointed Western Divisional Engineer of the Midland system, and among the more important works he then carried out were:—Avonmouth Dock extension of sidings, King's Norton widening, new sidings and stations in connection with various munitions works, and the reconstruction of a number of bridges. It was in 1928 that he took over the Derby South District, L.M.S.R., since when he has been responsible for the reconstruction of Trent viaduct (described in our issue of March 17, 1933), the widening of various and the building of other bridges, including one of 100 ft. span at Saffron Lane. He has also advised upon and supervised the building of many new bridges in the Nottingham Town Development scheme. Mr. Frere was elected a Member of the Institution of Civil Engineers in 1905, was the author of "Permanent Way Diagrams giving Spread of Crossings" (1909), and in 1920 was decorated with the O.B.E. for special railway work carried out for the Government during the War. He has also been a Member of the Institute of Transport since 1921 and until 1931.

The late Mr. F. H. Frere, O.B.E.,

District Engineer, Derby South District, L.M.S.R., 1928-34

Mr. C. C. Verrinder, who has been appointed Agent General in France for the British Railways (Agence Officielle des Chemins de fer Britanniques)—whose new joint office at 12, Boulevard de la Madeleine, Paris, 9e, was described in our issue of January 5—commenced his railway career on the old London & South Western Railway, and was transferred from the Superintendent of the Line's Office to the Paris Office of the L. & S.W. in 1914, as Assistant to the Agent. In 1916 he was appointed Acting Agent and remained in charge of the office during the whole time that the Havre-Southampton route was the only one open to civilian passengers. In 1921 he was appointed Paris Agent and soon after the creation of the Southern Railway became General Agent for France in July, 1924. In June, 1932, he was created a Chevalier of the Legion of Honour. Mr. Verrinder has acted as liaison officer with the French Railway Administrations in arranging the journeys of many notable personages, including His Majesty the King—on the occasion of his returning from a cruise, when he landed at Genoa—and His Royal Highness the Duke of Connaught on his annual visits to the South of France.

Mr. C. C. Verrinder,

Appointed Agent General in France for the British Railways

Mr. H. Haigh has been appointed Secretary of the Railway Convalescent Homes in succession to Mr. W. R. R. Culver, whose retirement at the end of last year was recorded in our issue of December 29.

Mr. A. Cameron, Oriental Manager, and sometime General Traffic Agent for Europe in London, of the Canadian Pacific Railway, is retiring. He is succeeded by Mr. D. Drummond, General Traffic Manager, C.P.R., at Southampton until 1932, when he proceeded to Hongkong as Assistant Oriental Manager.

Mr. Frank Frederick Hixson, M.Inst.C.E., has been appointed General Manager of the Central of Peru Railway (Peruvian Corporation Railways), replacing Mr. M. Y. Grant, who has retired. Mr. Hixson spent 12 years in London, South Africa, and Manchester, on various engineering works, followed by 22 years' experience in railway and bridge construction and maintenance work in South America, having been for the last 15 years Chief Engineer of the Central of Peru Railway, the highest standard-gauge railway in the world. He was elected a Member of the Institution of Civil Engineers in 1930.

Mr. F. F. Hixson,

Appointed General Manager, Central of Peru Railway

The Argentine Government has recognised as legal representatives of the Buenos Ayres & Pacific Railway, Mr. Mervyn F. Ryan, Dr. Manuel A. Montes de Oca, Dr. Angel Gallardo and Dr. Luís P. O'Farrell.

Mr. H. D. Boyd, a Departmental Manager, and Mr. W. H. Higginbotham, Secretary and Chief Accountant, have been appointed Directors of Edgar Allen & Co. Ltd., Imperial Steelworks, Sheffield.

From the *London Gazette*:—Engineer and Railway Staff Corps—Major A. C. Stamer, C.B.E., M.I.Mech.E., resigns his commission (December 31, 1933). Major Stamer is the recently retired Assistant C.M.E., L.N.E.R.

Port Reorganisation—A National Problem*

By Frank Brown, Assistant General Manager, Port of Bristol Authority

In tracing the history of dock development in the United Kingdom the author draws attention to the heavy burden on dock capital due to so many docks becoming obsolete, owing to the great advances in the size of vessels and the changing conditions of trade. The docks of the United Kingdom already represent over £200,000,000 of capital, and further expenditure is still being made notwithstanding the diminution of overseas trade. There are 15 to 20 ports of first-class rank in Great Britain, and hundreds of smaller harbours, wharves and shipping places; and, except for a few particular and isolated trades, competition is general and acute. Dock owners include railway companies, municipal authorities, public trusts, landowners, shipowners, manufacturers, statutory companies, joint stock companies and colliery proprietors.

Ports have grown up as single units, and this, coupled with the numerous forms of ownership, has led to variations in facilities, rates of pay, dock dues on ships and goods, handling charges, and handling methods. The question is further complicated by the fact that railway docks are largely supported out of general railway revenues, but non-railway docks have to rely on dock revenues. There is confusion and differentiation in fixing and apportioning railway rates and dock charges, and uncertainty of the extent to which dock services and accommodation are covered by the railway rates. At some ports it is said that railway rates cover the conveyance of traffic to and from the ship's side; in others it is stated that such rates cover only the journey to the dock junction; and in others, that the rates cover the services of shipping and stowing outward cargo and discharging and landing inward cargo. At some docks allowances are made to traders out of the railway rates, while, at other docks, allowances are made to the dockowners. Traffics from one area are granted allowances from railway rates, while similar traffics from another to the same port are not. Imported goods are treated differently from goods exported. The present methods of differentiation and discrimination are confusing to merchants, manufacturers and shipowners and are inimical to general efficiency. Co-ordination and simplification should lead to reduced transport costs and the discouragement of long journeys to or from the ports where shorter journeys could be substituted. The influences of markets, the habits of merchants, the interests of steamship lines, the operation of shipping conferences, have an important bearing on the routes of overseas trade.

The Royal Commission on Transport in its report of 1931 favoured the idea of the formation of " port groups," but was not at that stage prepared to recommend that docks at present railway owned should be divorced from railways. An instance of port grouping exists on the Thames, where, for many years, there was difficulty and strife. As a result of the Port of London Act, under which practically all the docks were merged in one public trust, there has been a marked improvement in every direction.

About £160,000,000 of dock capital is in the hands of public trusts, municipal authorities, and statutory companies, and about £68,000,000 of dock capital is invested in railway-owned docks. Even before the war the country was open to the charge that it was over-equipped in the matter of docks, and it is significant that, except for coal loading, the work of shipping and unshipping proceeds for only 44 hours a week, or 25 per cent. of the time, while railways, factories and mills rely on a much longer active working week.

The percentage returns on dock capital expenditure during the last three years are compared in the following table:—

	1930.	1931.	1932.
London	4·04	3·46	3·75
Liverpool	4·51	3·76	3·79
Manchester ...	3·52	3·22	2·84
G.W.R. Docks ...	1·93	0·82	0·73
L.N.E.R. Docks ...	0·83	0·36	0·21
L.M.S.R. Docks ...	*Dr.* 0·65	*Dr.* 0·79	*Dr.* 0·84
Southern Railway Docks	3·73	3·38	2·68
Bristol	3·18	3·21	3·62

The potential capacity of ports in 1913 was in excess of the volume of business offered. Since then more docks have been built and equipment has been improved. The present potential capacity of the ports is greater than in 1913, yet the maritime trade has fallen. The wide gap between potential capacity and the volume of trade—present and prospective—forms the biggest problem to be solved in port reorganisation.

If port grouping is to come it will be as a matter of national expediency. A port grouping scheme should be framed on commercial lines, *i.e.*, the formation of a trust on which representatives of trade and commerce, local authorities, transport and labour, would appear under a carefully balanced representation. The line of demarcation between railways and docks would have to be clean cut and there would have to be definite legislation in regard to the relationship between the railway companies and the dock authorities. Another alternative is, obviously, railway ownership. It may be urged that if all the docks of the country were taken over by the railway companies, a great step forward would be made in the direction of the best and co-ordinated use of railway and dock facilities. This presupposes three things: (1) Abolition of any competition between the groups for overseas trade; (2) a satisfactory assurance that road and coastwise transport should have equal and adequate facilities; (3) a unification of the railway companies in the form of a public trust. It is difficult, however, to imagine all docks becoming railway owned, for this would involve great trusts and corporate bodies like the Port of London, Mersey Docks and Harbour Board, Clyde Navigation, Manchester Ship Canal, the Port of Bristol Authority, and the Leith Harbour Commissioners, losing, not merely their identity, but the benefits which spring from the co-ordinated effort of local interests.

A full examination of our port system by a Royal Commission or Departmental Committee is of urgent importance. Within the scope of reformation are the following objects:—

(1) The discouragement of such competition as takes merely the form of diversion of trade without public advantage.

(2) The co-ordination of port activities so as to minimise conflicting services and ensure that the whole machine may work more smoothly, economically and efficiently.

(3) The simplification of charges both in respect of dues on ships and goods, as well as for the processes of loading and unloading, the straightening out of the tangle between railway rates and services, and dock rates and services.

(4) The better provision for the amortisation of capital represented by obsolete or obsolescent dock accommodation and facilities.

(5) The encouragement of traffic to flow—as far as other economic factors permit—along natural channels.

(6) The elimination, in the interests of trader and dock worker as well as the public, of customs and practices which are restrictive, and inimical to the efficient and economical conduct of business.

(7) The provision of scope for the incentive and enterprise of local interests—traders, merchants, shipowners, ancillary dock services and local authorities.

The great need is a policy based on long range views and the appointed goal is the creation of a thorough port system serving national needs, but the economic structure of international trade is so delicate that the work of reform must be gradual and steady.

* Precis of a paper which was awarded the gold medal of the Institute of Transport for the most meritorious contribution during 1933 on dock and harbour questions. The author, prior to his appointment at Bristol in 1929, was Assistant Chief Docks Manager of the Great Western Railway. He has had over 30 years' experience of the docks and railways of the Bristol Channel. The paper is reproduced in full in the current issue of the Journal of the Institute of Transport.

THE HELLIFIELD FATAL COLLISION.—The adjourned inquest on the two enginemen killed in the fatal collision of December 19, was concluded on Wednesday, January 17, when a verdict of accidental death was returned. It now appears that the goods brake, which ran away and collided with the goods train, escaped from the loop because the entrance points were open to receive the goods train in the loop. What is not yet clear is how the van ran back down the loop if, as the guard asserts, he had screwed down the brakes.

An Electric Model Railway in Argentina

In this working model, trains are controlled by track circuits and automatic signals. It is on view at Retiro terminus, Central Argentine Railway, Buenos Aires, and is operated by coins for charities

There has recently been placed in the grand hall of the Retiro terminus of the Central Argentine Railway at Buenos Aires, a working model of a section of the company's electrified suburban system, with two miniature trains and automatic signals, which can be set in motion by means of a 10-cent coin inserted in a slot. The sums collected will be divided equally between the local British Hospital and an Argentine institution for the care of lepers. The model was inaugurated on October 3 last in the presence of Mr. W. Howard-Williams, C.B.E. (London Director), Engineer Atanasio Iturbe (Chairman, Local Board), Mr. Ronald Leslie (General Manager) and most of the chief officers. Señora Casares de Blaquier (President of the above-mentioned leper charity) set the mechanism in operation by inserting the first coin.

The model consists of a miniature stretch of track about 23 ft. long with a loop 16 ft. long, enclosed in a glass case. The lower portion of the cabinet contains the electrical apparatus for the track circuits, signals, motive power and coin control, all of which operate from the 220 volt d.c. lighting supply through suitable resistance lamps. When a coin is inserted a contact is made which, in order to set in motion the sequence of operations according to the positions of the trains, momentarily energises the second windings of the stick track relays controlling

Left: end view, and Right: general view of the Argentine model railway showcase

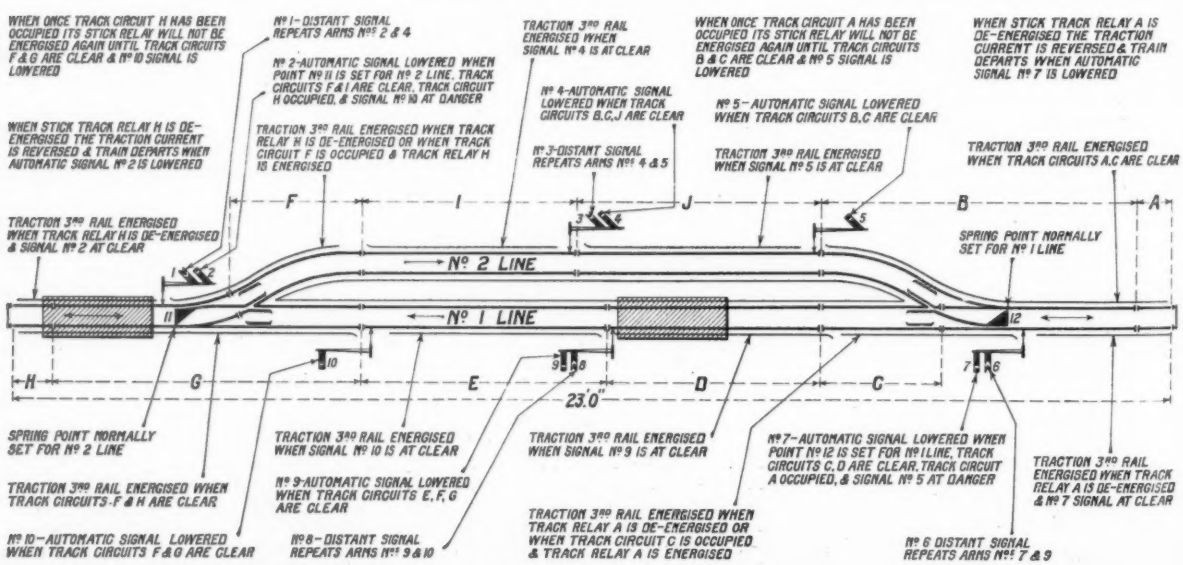

WHEN ONCE TRACK CIRCUIT H HAS BEEN OCCUPIED ITS STICK RELAY WILL NOT BE ENERGISED AGAIN UNTIL TRACK CIRCUITS F & G ARE CLEAR & Nº 10 SIGNAL IS LOWERED
Nº 1- DISTANT SIGNAL REPEATS ARMS Nºs 2 & 4
Nº 2-AUTOMATIC SIGNAL LOWERED WHEN POINT Nº 11 IS SET FOR Nº 2 LINE, TRACK CIRCUITS F & I ARE CLEAR, TRACK CIRCUIT H OCCUPIED, & SIGNAL Nº 10 AT DANGER
TRACTION 3RD RAIL ENERGISED WHEN SIGNAL Nº 4 IS AT CLEAR
WHEN ONCE TRACK CIRCUIT A HAS BEEN OCCUPIED ITS STICK RELAY WILL NOT BE ENERGISED AGAIN UNTIL TRACK CIRCUITS B & C ARE CLEAR & Nº 5 SIGNAL IS LOWERED
WHEN STICK TRACK RELAY A IS DE-ENERGISED THE TRACTION CURRENT IS REVERSED & TRAIN DEPARTS WHEN AUTOMATIC SIGNAL Nº 7 IS LOWERED
Nº 4-AUTOMATIC SIGNAL LOWERED WHEN TRACK CIRCUITS B,C,J ARE CLEAR
Nº 5-AUTOMATIC SIGNAL LOWERED WHEN TRACK CIRCUITS B,C ARE CLEAR
WHEN STICK TRACK RELAY H IS DE-ENERGISED THE TRACTION CURRENT IS REVERSED & TRAIN DEPARTS WHEN AUTOMATIC SIGNAL Nº 2 IS LOWERED
TRACTION 3RD RAIL ENERGISED WHEN TRACK RELAY H IS DE-ENERGISED OR WHEN TRACK CIRCUIT F IS OCCUPIED & TRACK RELAY H IS ENERGISED
Nº 3-DISTANT SIGNAL REPEATS ARMS Nºs 4 & 5
TRACTION 3RD RAIL ENERGISED WHEN SIGNAL Nº 5 IS AT CLEAR
TRACTION 3RD RAIL ENERGISED WHEN TRACK CIRCUITS A,C ARE CLEAR
TRACTION 3RD RAIL ENERGISED WHEN TRACK RELAY H IS DE-ENERGISED & SIGNAL Nº 2 AT CLEAR
SPRING POINT NORMALLY SET FOR Nº 1 LINE
Nº 2 LINE
Nº 1 LINE
SPRING POINT NORMALLY SET FOR Nº 2 LINE
TRACTION 3RD RAIL ENERGISED WHEN TRACK CIRCUITS F & H ARE CLEAR
Nº 10-AUTOMATIC SIGNAL LOWERED WHEN TRACK CIRCUITS F & G ARE CLEAR
TRACTION 3RD RAIL ENERGISED WHEN SIGNAL Nº 10 IS AT CLEAR
Nº 9-AUTOMATIC SIGNAL LOWERED WHEN TRACK CIRCUITS E, F, G ARE CLEAR
Nº 8-DISTANT SIGNAL REPEATS ARMS Nºs 9 & 10
TRACTION 3RD RAIL ENERGISED WHEN SIGNAL Nº 9 IS AT CLEAR
TRACTION 3RD RAIL ENERGISED WHEN TRACK RELAY A IS DE-ENERGISED OR WHEN TRACK CIRCUIT C IS OCCUPIED & TRACK RELAY A IS ENERGISED
Nº 7-AUTOMATIC SIGNAL LOWERED WHEN POINT Nº 12 IS SET FOR Nº 1 LINE, TRACK CIRCUITS C, D ARE CLEAR, TRACK CIRCUIT A OCCUPIED, & SIGNAL Nº 5 AT DANGER
Nº 6 DISTANT SIGNAL REPEATS ARMS Nºs 7 & 9
TRACTION 3RD RAIL ENERGISED WHEN TRACK RELAY A IS DE-ENERGISED & Nº 7 SIGNAL AT CLEAR
23.0"

Diagram of the automatic model railway at Retiro terminus, Buenos Aires

the reversal of the traction current at each end of the model. These relays then complete the circuit of the main control stick relay which, when energised, closes the contacts for the functioning of the model and its illumination, and also energises a small electro-magnet, which allows the coin to fall into the cashbox. This final action thus breaks the coin contact and leaves the main control stick relay energised through another contact on an impulse relay, which, due to the trains entering and leaving the end track section, opens the circuit of the former, after a certain number of operations of the stick relay have taken place at the left hand end of the model.

The period of operation is about one minute for each coin inserted, the signals being lowered and current applied to the various sections of the third rail only when their respective track circuits are clear, so that the trains circulate with complete signal protection. When the impulse relay operates, the circuit of the main control stick relay is broken, and all current is therefore automatically cut off and the trains come to rest immediately. The trailing points at each end of the loop are spring-controlled, and are normally set for left hand running in each direction. The model was constructed in the workshops of the company's Telegraph and Signals Department at Rosario to the designs of Mr. J. Parsons, M.I.R.S.E., A.M.I.Mech.E., Telegraph and Signals Superintendent.

Forthcoming Events

Jan. 26 (*Fri.*).—Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, 6 p.m. "The Automatic Combustion Control of Boiler Plants," by Messrs. L. L. Robinson and J. L. Hodgson.

Jan. 27 (*Sat.*).—Permanent Way Institution (London), at Institution of Civil Engineers, 2.30 p.m. General Meeting; and at Maison Lyons, Shaftesbury Avenue, W.C.1, 6.30 p.m. Annual Winter Dinner.

Railway Students' Association (London). Visit to Euston-Watford Signalling Installations, L.M.S.R.

Jan. 30 (*Tues.*).—L.N.E.R. (Middlesbrough) Lecture and Debating Society, at Grand Hotel, West Hartlepool.

Institution of Civil Engineers, Great George Street, S.W.1, 6 p.m. Discussion on bridge stress papers by Messrs. Foxlee and Greet and Gelson.

Feb. 1 (*Thurs.*).—Railway Students' Association (Edinburgh), at Goold Hall, St. Andrew Square, 7.45 p.m. "Closing of Branch Lines," by Mr. W. Strachan.

Feb. 3 (*Sat.*).—Locomotivemen's Craft Guild (London), at Borough Polytechnic Inst., S.E.1, 6.30 p.m. "G.W.R. Locomotives," by Mr. W. H. Pearce.

Feb. 5 (*Mon.*).—Society of Engineers, at Geological Society, Burlington House, Piccadilly, London, W.1, 6 p.m. Presidential Address by Mr. A. M. A. Struben, O.B.E.

Stephenson Locomotive Society, at King's Cross Station, London, 6.30 p.m. "The Evolution of the Single-Wheeler Locomotive," by Mr. A. G. Williamson.

Feb. 6 (*Tues.*).—L.N.E.R. (York) Lecture and Debating Society, at Railway Inst., Queen Street, 7 p.m. "How Parliament has dealt with the Salter Report," by Mr. P. A. Harverson.

Retired Railway Officers' Society, in Room 300, Great Eastern Hotel, Liverpool Street, London, E.C.2, 2.30 p.m. Ordinary Meeting.

Railway Bridge Stresses

Two important papers were presented last Tuesday to the Institution of Civil Engineers, one on "Hammer-Blow Impact on the Main Girders of Railway Bridges,"* the other on "Moving-Load Stresses in Short-Span Railway Bridges."†

The former suggests that the present practice of making allowance for dynamic stresses by means of an impact-factor multiplier of the maximum static live load should be retained, but that hammer blow, lurching, and track irregularities should be separately computed. The derivation of simple, practical formulæ for such an impact-factor allowance is considered both desirable and possible. The large number of bridge and load characteristics involved and the five possible states of maximum bridge oscillation are first considered. Only one of these five conditions can be the criterion for a given span and loading. The investigation is developed in four main stages.

In Stage I general expressions for the Impact Equivalent Uniformly Distributed Load (E.U.D.L.) are given in terms of (1) the dynamic magnifier and (2) the central dynamic deflection. They are used to derive formulæ for the Impact E.U.D.L. with skidding-wheel conditions in terms, respectively, of the relevant bridge and load characteristics for the two conditions of maximum oscillation with the springs of the locomotives locked by spring friction, and of all bridge and load characteristics for the two conditions of maximum oscillation at synchronism with the springs of the locomotives acting. Selective formulæ are also derived by means of which it is possible to determine which of the five states of maximum oscillation is the criterion for any given span and loading. This stage concludes with a consideration of the effect of the tender and following train on the values of the impact given by the analytical formulæ.

The analysis of the skidding-wheel conditions is continued in Stage II. Simplifying approximations are made to the formulæ derived in Stage I for the impacts at synchronism with springs free. Approximate formulæ are also derived in terms of all bridge and load characteristics for the Impact E.U.D.L. with the springs free at the limiting speed. A general process of simplification is then introduced whereby all the formulæ are expressed in terms of hammer blow, span-length, free frequency and functions of the dead and live loads only.

Stage III considers the effect of the diameter of driving-wheels. It is believed that the errors introduced by assuming that a skidding locomotive delivers an unlimited number of impulses of constant magnitude to the span may be considerable. An approximate method is submitted for reducing the impact results obtained in the two previous stages to allow for the fact that the driving-wheels deliver only a limited number and magnitude of impulses (determined by their diameter and position).

The final simplification of the problem is reached in Stage IV by assigning a minimum wheel-diameter to the gauge of railway under consideration, and a range of variation of bridge masses and free frequencies. The upper and lower probable limits to the number of units of axle-loading and the magnitude of the engine hammer blow for the given gauge are also fixed. Net maximum impact curves are then plotted for a series of loadings whose hammer blows and axle-loadings vary widely. Formulæ for the impact-factor allowance are then derived in terms of span-length, hammer blow and number of units of axle-loading, such that when converted to equivalent uniformly distributed load they will satisfy the complete range of hammer blows and axle-loadings between the agreed limits and will give a curve for any specified hammer blow and axle-loading to cover with a reasonable degree of accuracy the net maximum impact obtainable with any mass-frequency combination.

Moving-Load Stresses in Short-Span Railway Bridges

This paper deals with tests made by the Bridge Branch of the North Western Railway of India as part of a comprehensive investigation undertaken by the Bridge Committee of the Indian Railway Board in order to determine the reserve of strength in existing bridges. The first part, dealing with the impact effects produced by vertical forces, is based on the British Bridge Stress Committee's earlier work, which it was intended to extend where extension or further investigation was considered necessary. The impact effect is made up of three partial effects, hammer blow, lurching or rolling of the live load, and the effect of rail-joints. The Bridge Stress Committee's conclusions in regard to the hammer blow were generally confirmed. An experimental method for accurate measurement of locomotive hammer blow is explained in the appendix. Lurching has been investigated in considerable detail with special instruments. The amplitudes of the oscillations about a longitudinal horizontal axis have been found to vary directly as the speed, but when the angular movement is translated into terms of increased rail pressure, the engine spring constants modify this considerably. The lurching effect cannot,

* By Richard William Foxlee, M.Inst.C.E., and Ernest Hira Greet, B.Sc., A.M.Inst.C.E.

† By William Edward Gelson, B.Sc., A.C.G.I., A.M.Inst.C.E., A.M.I.Mech.E.

strictly speaking, be calculated directly from the spring calibration, as a consideration of the elasticity of the spring-borne system is required. A mathematical analysis is given which enables the lurch to be calculated at any speed on a short span bridge given the angle of roll, the hammer blow (if any) and the spring constants. The behaviour of laminated springs under pulsating loads has been investigated by means of a special testing machine. It was found that the blow, expressed in tons of additional load, due to rail joints, increased with a fractional power of the speed and not the second power, as stated in the Bridge Stress Committee's report. Total impact values on spans up to 40 ft. for all speeds under the heaviest class of engine are calculated.

Horizontal Forces

The second part of the paper is concerned with the dispersion of horizontal forces in bridges due to braking and traction. Experiments were made to ascertain how the horizontal forces are dispersed from the rails into the substructure. Provided the fishbolts are tight on the bridge and well on to the approaches, the problem is, broadly speaking, one involving the relative longitudinal stiffness of the track and that of the masonry in resisting horizontal forces.

In the first series of experiments, carried out on multiple-span bridges up to 40 ft. clear span with the tightness of the running rails and guard rails varied, the test spans were mounted on special roller rocker bearings at each end and anchored longitudinally to the masonry by a special link. Records from stress recorders applied to the link during the test runs enabled the longitudinal forces which passed to the masonry to be accurately determined. It was demonstrated that guard rails take a high percentage of the horizontal forces. The method of testing described above cannot be applied with sliding bearings without assuming a value for the bearing friction. The arrangements were therefore revised and new testing apparatus was constructed. Sufficient evidence was obtained, however, to show that in a multiple-span bridge the total force taken by the masonry is very evenly divided between the supports of a bridge fitted with sliding bearings.

In the later tests, the axial traction load passing through the rails, both ahead and behind the locomotive, was calculated from optical records of the stress in special " track links " inserted in the line on the bridge at the required position. The actual drawbar pull was determined from a continuous record of stress in a special drawbar fitted to the first wagon behind the engine. Tests made on a ballasted deck bridge of three 40 ft. spans on relatively stiff piers showed that each pier or abutment absorbed approximately 20 per cent. of the tractive force, the remaining 20 per cent. passing into the approaches by way of the running rails. In a second bridge of three 40 ft. spans on very flexible piers 57 per cent. of the force passed into the approaches via the rails.

Tests of braking effects were carried out on one of these bridges, the braking force being calculated from the measured deceleration when the brakes were applied. The indicated braking force is compared with the sum of the forces passing through the rails during the time the brakes were in action. Except in the case of single span tests, relief given by the track was in agreement with that obtained in the traction effort tests. The results for braking show that, although the braking force fluctuated greatly during the time the load was decelerating from about 8 m.p.h. to a standstill, the rails did not respond markedly to the sudden fluctuations.

Longitudinal Stiffness of Track

Tests to determine the longitudinal stiffness of the track were made with a pair of track links inserted at a joint in a section of ballasted spiked 90 lb. F.B. road. The results gave a stretch of 0·002 in. per ton for a pair of rails, the whole of the applied force being transferred to the ground in a length of 30 ft. from the joint. This result can be applied to any particular bridge where the longitudinal forces are likely to be critical. Assuming the friction of the sliding bearings when the span is loaded to be sufficient to transmit the necessary proportion of the longitudinal force to the piers, the division will be in the ratio of the stiffness of the track to that of the piers.

This investigation has led to the following important conclusions:—

(*a*) The allowance for dispersion of braking and traction forces through the track at the ends of a multiple-span bridge is proportional to the weight of braked and driven axles respectively. The forces calculated by the B.E.S.A. formulæ may be reduced by not less than the following total amounts:—

Standard of loading	Allowance for dispersion of horizontal forces through the track Tons
5 ft. 6 in. gauge B.L. (17-ton axle loads)	7·5
5 ft. 6 in. gauge M.L. (22½-ton axle loads)	9·0
5 ft. 6 in. gauge H.M. (28-ton axle loads)	11·5

In the case of single span bridges up to 80 ft. long, these allowances may be increased by 50 per cent.

(*b*) For spans supported on sliding bearings, the horizontal forces can be considered as being divided equally between the two ends; for spans which have roller bearings at one end, the whole of the horizontal forces can be considered to act through the fixed end.

(*c*) In a multiple-span bridge, the net horizontal force after deducting dispersion can be assumed to be distributed equally amongst the spans covered by the braked or driven axles.

The discussion on these papers is to be continued at a meeting of the Institution of Civil Engineers next Tuesday at 6 p.m. We refer to the papers editorially on page 123.

Interior of the new Paris joint office of the British main-line railways, which is under the management of Mr. C. C. Verrinder, whose portrait appears on page 140. This office, which occupies a corner site at 12, Boulevard de la Madelene, was opened on January 2, as described in our issue of January 5

The Dry-docking of the "Majestic"

The entry of the *Majestic* into the King George V Graving Dock at Southampton, planned for Thursday of last week, was the occasion of a ceremony followed by a luncheon given jointly by the Southern Railway and the White Star Line. A large party of guests travelled down from London, but on arrival it was announced that, owing to the gale, it was deemed inadvisable that the *Majestic* should be moved. Consequently, the programme was altered to include an inspection of the dock and the power-house, with a visit to the *Majestic* at the new quay.

The guests then repaired to the South-Western Hotel for luncheon, at which Mr. G. W. E. Loder, Chairman of the Southern Railway, presided. In proposing the toast of "The Owners of the *Majestic*," he referred to the long and honourable history of the White Star Line and said that the owners of the *Majestic* and the Southern Railway had passed an important milestone in the development of the port. When the King opened the dock six months ago, the trade outlook was dismal. The reverse was the case to-day, and Sir Herbert Walker had informed him that figures for 1933, just to hand, showed that under every head of the business at Southampton, both in passengers and cargo tonnage, the company would be able to record an increase over 1932.

Lord Essendon, in the course of his reply, said that it was a matter of common knowledge that the Cunard and White Star had come to an agreement for merging their North Atlantic assets. It was a matter also of common knowledge that there were certain formalities to be gone through before that merger could be brought into effect. It was the intention that the North Atlantic assets of these two companies should be transferred to the new company, but in every other respect the companies would maintain their separate entities. He hoped that these two companies would benefit from this arrangement and that the port of Southampton would materially benefit as well. Application had been made by shipowners to the Government for assistance, but whatever the Government did, he sincerely hoped they would not do anything to increase the restrictions and limitations with which the industry was already overwhelmed and almost suffocated.

The weather moderated on Friday last, and the *Majestic* was docked about midday. An illustration of the docking operation appears on page 138.

New Steamship for the Great Western Railway

On January 13 the Great Western Railway took delivery at Fishguard of its new twin-screw passenger, cattle, and cargo steamer *Great Western*, which was built and engined by Cammell Laird & Co. Ltd., Birkenhead, under Lloyd's Special Survey to Class 100 A.1, and also conforms fully to the Board of Trade requirements in pursuance of the Merchant Shipping (Safety and Load Line Conventions) Act, 1932. The principal dimensions are: length overall 292 ft., breadth (moulded) 40 ft. 3 in., depth 17 ft. 1 in.; the vessel is certificated for 450 passengers, and has two steel masts with derricks capable of lifting 6 tons.

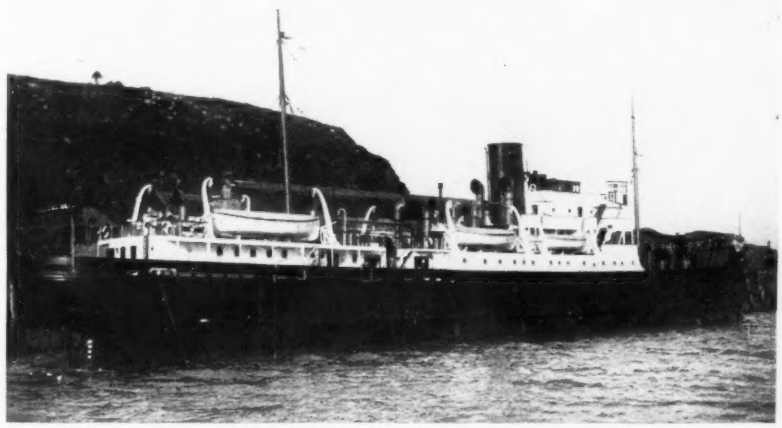
The propelling machinery, designed by Cammell Laird & Co., consists of two sets of triple-expansion reciprocating engines with a total of 1,700 h.p., capable of giving a service speed of 13 knots. Steam is generated in two Babcock & Wilcox boilers burning coal, supplied by mechanical stokers of the retort type, this being the first British vessel to be built fully equipped for mechanical firing. The coal bunkers are situated between the engine and boiler rooms and are fitted with hinged hatches of special construction to facilitate bunkering by means of containers.

The passenger accommodation, on the shelter and boat decks, comprises fifteen two-berth cabins and one suite-de-luxe, together with open berth cabins. A dining saloon, smoke-room, and ladies' lounge have been provided for first-class passengers and a dining saloon aft for third-class passengers. The cabins and public rooms are heated and ventilated on the thermo-tank principle with a temperature regulating attachment under the personal control of the passengers. Hot and cold running water is also provided in each cabin.

Accommodation is available on the upper and second decks for 666 head of cattle, and special stalls have been provided amidships for the conveyance of 35 horses. Three large holds are provided for the conveyance of cargo, specially ventilated by electric fans for the transport of perishable traffic.

A wireless direction finder and auto alarm has been provided, and submarine signalling apparatus, together with distance finder and electric log, has been installed experimentally, the Waterford route being the only one on which the G.W.R. operates a steamship service where this apparatus can be utilised.

The new vessel, which ran her first trip to Waterford on January 22, will replace the *Great Southern* and should do much to popularise the Fishguard-Waterford service. The *Great Southern*, which has operated the service for over thirty years, has now been placed on the disposals list and will probably be sold for breaking-up.



The "Great Western" alongside the quay at Fishguard

DORMAN LONG NEW TRUSTEES.—Holders of the 5½ per cent. first mortgage redeemable debenture stock of Dorman Long & Co. Ltd., at a meeting in London on January 23, approved the appointment of the Prudential Assurance Co. Ltd. as trustees for the stockholders in place of Barclays Bank Limited, who desired to be discharged from the trusts. A resolution was also carried by a majority vote for the appointment of a debenture stockholders' committee of seven for the purpose of conferring with the directors and representing the interests of the debenture stockholders in connection with the formulation of proposals for dealing with the company's position.

RAILWAY AND OTHER MEETINGS

BENGAL & NORTH WESTERN RAILWAY CO. LTD.

The annual meeting of shareholders of the Bengal & North Western Railway Co. Ltd. was held at Winchester House, London, E.C.2, on Tuesday, January 23, Sir Henry P. Burt (Chairman of the company) presiding.

Lieut.-Colonel W. R. Izat, D.S.O., R.E., Managing Director, read the notice convening the meeting and the auditors' report.

The Chairman, in moving the adoption of the report and accounts, said he much regretted that Sir George Sutherland was absent from their meeting. He was only now recovering from a serious illness and had had to go abroad. He was sure they all hoped that he would soon be completely restored to his usual health. Colonel Gracey, R.E., was also detained on the Continent owing to an accident to his daughter. Proceeding, he said they were meeting under the shadow of a catastrophe which was causing the greatest concern to the Board. The earthquake which occurred in India the previous week had taken a very heavy toll of life and property in many of the districts served by their railway. He was sure it would be understood that under such conditions when communications were seriously interrupted, it was almost impossible for their staff readily to move about to investigate in detail the full extent of the damage. The latest telegrams they had received from their Agent were more reassuring.

They now knew that through railway communication had been re-established on the whole of the company's section except at the large Inchcape bridge near Chupra which was seriously damaged, although it was hoped that there transhipment could be arranged.

The Tirhut section had suffered much more extensively, several bridges having been rendered impassable. However, even on that section, communication now existed between the main line and Samastipur and Mazafferpur. It was not expected that through running on the branches to the north from Mazafferpur, Samastipur and Mansi would be established for several weeks. He was glad to say that none of their European staff had been injured.

They could not expect to receive for some time to come any accurate estimate as to the cost of restoring the bridges and permanent-way, the time it would take to effect them, nor, which was very important, to what extent their traffic would be affected, especially as so many sugar factories had been damaged. It was certain that the cost of restoration would be heavy, although not on the company's section. Their earnings, for a time, might suffer severely, so their prospects for the ensuing year were open to considerable uncertainty.

He would now deal, as usual, with the results of the year under review ended September 30 last as presented in the directors' report. Having regard to the fact that the world was only now emerging from the depressieon which for so long had impeded prosperity, the results for the past year could not, he thought, be looked upon as unsatisfactory. Compared with those of the previous year, the gross earnings increased by Rs. 8·5 lakhs and the working expenses by Rs. 5·8 lakhs, the net result being an increase in the net earnings of the Joint Undertaking of Rs. 2·7 lakhs. As, however, the increase in the gross earnings occurred mostly on the Tirhut Railway, the result to the company was that their share of the net earnings had fallen from Rs. 103·37 lakhs to Rs. 102·97 lakhs, a small decrease of Rs. 40,000.

The decrease in the number of passengers unhappily continued and occurred principally in the third class, the numbers travelling being about 1¼ million less than last year and about 4¾ million less than those carried in 1931. The principal reason for this falling off was the reduced spending power of the people, another reason being that in the past they carried large numbers of coolies to Bengal and Assam to supply the labour market in those provinces. As the demand for this class of labour was now very restricted, the coolie had found it easier to secure work at a better wage locally in the sugar factories which were rapidly springing up in the districts served by the railway.

Goods traffic, he was glad to say, had continued to improve; the number of tons lifted on the open system during the year was the heaviest on record, being some 579,000 tons more than last year, while the receipts exceeded those of last year by nearly 12 lakhs of rupees. That satisfactory increase was almost entirely due to the development of the sugar industry, to which he alluded when he addressed them last year.

A few years ago, the sugar factories at stations on their railways were few and far between. Before the occurrence of the recent catastrophe, it was anticipated that no less than 59 factories would be in operation during the forthcoming season, while the erection of still more was contemplated. The sugar factories, however, were for the most part in the area seriously affected by the earthquake, and he was afraid therefore that they could not now look for an immediate expansion in their cane and sugar traffic. Hitherto, a large proportion of the sugar required for consumption was imported from Java and its distribution from the seaports was rendered possible by its cheapness. The heavy customs duty which had recently been imposed on this imported sugar had brought into existence the large number of new factories in Behar and the United Provinces, and it was now necessary to take advantage of the altered position by so adjusting their rates for sugar as to extend as far as possible the area over which this large increase in the output of the indigenous produce could be profitably marketed. The railways concerned were now making a combined effort to bring this about by a reduction of rates to the ports and intermediate stations. It might be mentioned, however, that the river steamer companies were also making a strong bid to secure the traffic, and the competition would have to be met.

Their working expenses increased by just under Rs. 6 lakhs, principally owing to the renewal of 200 goods wagons, necessitated by the heavy increase in their goods traffic. The percentage of working expenses to gross earnings was still only 44·76, a slight increase of 0·61 compared with last year.

Dealing now with the net revenue account, the company's share of the net earnings, taking the rate of exchange at 1s. 6d. per rupee, amounted to £772,320, being only £2,955 less than last year. Owing, however, to the exchange on home remittances being more favourable by £3,026, the result was a small improvement in their net earnings of £71.

After making the necessary adjustments for income tax payment, interest on debenture and preference stocks, interim dividend and bonus, providing as usual the £35,000 for the sinking fund, and utilising £48,628, being the interest for the half-year ended September 30, 1933, on the company's reserves, the amount now to be dealt with was £304,012.

From this they recommended the payment of a dividend of 7 per cent., together with a bonus of 1 per cent., making for the whole year a total dividend of 16 per cent., the same as the last two years. This would increase their carry forward from £94,036 to £97,012.

With regard to matters of general interest, he might mention that during the last three years the company had had to incur heavy expenditure in connection with protection works at the Elgin bridge over the Gogra river. This work had now been completed.

On the Tirhut Railway, the Kosi river continued to threaten the main line, both above and below the large Kosi bridge. The necessary protective works were being undertaken, but as this bridge was on the Tirhut section, the expenditure would not affect the company.

The Board had asked Sir Robert Gales, of the firm of Messrs. Rendel, Palmer & Tritton, their consulting engineers, who was visiting India at present, to inspect and report on the protection works at both these bridges.

In addressing shareholders at the general meeting in 1931, he said that if the life of the company was prolonged after 1932, important issues would arise as to the position which a company, such as theirs, would occupy

in any new form of constituted government for India, and that these questions would require the anxious consideration of the Board to ensure that the rights they enjoyed under their contracts with the Secretary of State were adequately safeguarded. He had no doubt that this matter had attracted a good deal of their attention during the last few months, and as he dealt with the subject fully when he addressed the shareholders of the Rohilkund & Kumaon Railway last week, he did not think he could do better than repeat for their information what he said on that occasion, seeing that the interests of the two railways in this matter were identical.

Having repeated the remarks in question, the Chairman went on to say that he had already drawn attention to the fact that last year their goods earnings established a record and their earnings for the current year up to the time of the earthquake would have been larger but for the continued decline in the receipts from their passenger traffic. When normal conditions were once more restored, it was to a substantial improvement in that traffic rather than to any striking increase in their goods earnings that they must look for a return to the more prosperous conditions which they enjoyed before they were affected by the world-wide depression.

After all, he thought they would agree that it was a matter for considerable gratification that the company had been able to emerge so satisfactorily from the strain of the economic conditions which they had had to face in recent years, that their financial position remained unimpaired, and that for the last three years they had been able to maintain a dividend of 16 per cent. It was true that that dividend had not been fully earned and that to make a distribution of 16 per cent. they had to utilise the half-year's interest on their reserves, which this year amounted to £48,628, but this had been brought about entirely by the severe falling off in their coaching receipts to which he had already alluded.

In conclusion he should like to record their appreciation of the excellent way in which the staff of all ranks, both in India and in the London Office, had discharged their duties during the year. There could be no doubt that during the coming year the staff in India would have an exceptionally evy burden thrown upon them.

Replying to a shareholder who said he assumed that the expenses of repairing the earthquake damage on the Tirhut lines would not fall directly on their company, the Chairman said that mostly the expenditure on the Tirhut Railway would fall on that railway.

The resolution was unanimously adopted, and the proceedings closed with a hearty vote of thanks—moved by Mr. A. C. Rixon and seconded by Miss Monckton—to the Chairman, the Directors and the staff in India and the London office.

CONTRACTS AND TENDERS

More L.M.S.R. Locomotive Running Plant Contracts

Following the official announcement in last week's issue of THE RAILWAY GAZETTE of the locations of the 22 new water softening plants, the first contracts for which were exclusively announced in these columns as early as December 22 of last year, the L.M.S.R. has decided to make further important improvements in connection with the locomotive running department. The scheme, which is to be completed by the end of the year, entails the provision of mechanical coaling and ash disposal plants at ten locomotive depots. In addition, the layouts of the engine sheds at these centres will be improved to allow locomotives to be dealt with more rapidly than at present. The ten depots to be affected by this scheme are :—Rugby, Monument Lane and Aston (Birmingham), Edge Hill (Liverpool), Longsight (Manchester), Springs Branch (Wigan), Besiot (Staffs.), Walsall, Lancaster, and Farnley (Yorks.). Contracts for the mechanical coaling plants have been awarded to the following firms :—

Robert Dempster & Sons Ltd.

Mitchell Conveyor & Transporter Co. Ltd.

Henry Lees & Co. Ltd.

Babcock & Wilcox Limited.

Further Water Softening Plants for L.N.E.R.

The L.N.E.R. is shortly to place contracts for the installation of water softening plants at the following nine depots in London and the Eastern Counties :—Clacton, Colchester, Ipswich, Parkeston, Lowestoft, Norwich, Liverpool Street, Stratford, and Southend. These plants together will have the capacity of 697,000,000 gal. per annum. Fourteen water softening plants, the contracts for which have been announced from time to time in THE RAILWAY GAZETTE, are at present in course of construction on the L.N.E.R. main line between King's Cross and Doncaster, and numerous others are already in action, the oldest having been erected in 1892.

The L.N.E.R. has placed contracts as follow :—

For 20,500 Scots fir sleepers with J. Jones & Sons Ltd., Larbet; G. Morgan & Sons, Crieff; A. & G. Paterson Limited, Glasgow; J. R. Ellis, Kinross.

For 8,240 loads of crossing timbers with Burt, Boulton & Haywood Limited, London; May & Hassell Limited, London; Denny Mott & Dickson Limited, London.

For 1,535,000 gallons of creosote oil with the Gas Light & Coke Company, London; Chas. Page & Co. Ltd., London; Sadler & Co. Ltd., Middlesbrough; Shields & Ramsay Limited, Glasgow; Scottish Tar Distillers Limited, Falkirk; McCreath Taylor & Co. Ltd., Glasgow; Summers & Co., Glasgow; Cameron Warnock & Co., Glasgow; and J. Miller & Co. (Aberdeen) Ltd., Aberdeen.

The L.N.E.R. has also placed contracts with 17 firms for 6,100 tons of English and Scottish pig iron, and with eight British firms for 1,000 tons of steel fish-plates.

The Metropolitan-Vickers Electrical Co. Ltd., Belfast, has been awarded a part contract by the Great Northern Railway of Ireland for the supply of Cosmos electric lamps over a period of 12 months.

The South African Railways Administration is inviting quotations for 50 steam locomotives, Class 19C type (4-8-2 wheel arrangement with bogie tenders). The last date for receiving quotations is February 26. Specifications and drawings are being forwarded by air mail.

John I. Thornycroft & Co. Ltd. has received a tenth repeat order from the San Paulo (Brazilian) Railway for two Lightening six-cylinder 20-seater bus chassis.

The Furness Shipbuilding Co. Ltd. has received an order from the Crown Agents for the Colonies for 10 four-wheeled covered goods wagons for the Trinidad Government Railways.

The Birmingham Railway Carriage & Wagon Co. Ltd. has secured an order from the San Paulo (Brazilian) Railway for 150 four-wheeled steel wagons of 16 tons capacity.

The L.N.E.R. has placed a contract with the Siemens & General Electric Railway Signal Co. Ltd., Central House, Kingsway, W.C.2, for new signalling installations between Fenchurch Street Gas Factory junction and Bow junction.

The Lourenço Marques Railway Administration has placed an order for two Micheline railcars, and it is understood that the South African Railways Administration is likely to give an order for a similar vehicle in the near future.

The French Minister for Colonies is calling for tenders for nine complete diesel motor-trains to seat 80 passengers in different classes. The motor-trains, it is stated, are for service on the Indo-China railway service.

The Metropolitan-Cammell Carriage, Wagon & Finance Co. Ltd. has received an order from the San Paulo (Brazilian) Railway for 100 steel bogie open wagons of 30 tons capacity to be fitted with Sheffield-Twinberrow bogies as in the case of wagons already supplied by this firm to the same railway.

The British Consul at Porto Alegre reports that the Rio Grande do Sul State Railways are calling for tenders, to be presented in Brazil by February 12, for the supply of steel superstructures for three railway viaducts. Further details may be obtained from the Department of Overseas Trade, London.

The Egyptian State Railways Administration invites tenders for the supply and erection of a swing span for Hagar-El-Nawatia Bridge over Mahmoudia Canal, Cairo. Tenders will be received at the General Management, Cairo station, at 11.30 a.m., on April 18. Specifications and drawings can be obtained from the Chief Engineer, Way and Works Office, Cairo, or the Chief Inspecting Engineer, London.

NOTES AND NEWS

New Halt in Southern Scotland.—The new halt at Balgreen Road on the Corstorphine branch of the L.N.E.R. will be opened for passenger traffic on January 29.

U.S.A. Car Loadings, 1933.—The Car Service Division of the A.R.A. announces that 28,960,910 cars were loaded with revenue freight in 1933, compared with 28,179,952 in 1932 and 37,151,249 in 1931.

Coming South African Locomotive Orders.—According to an Exchange Cape Town message, Parliamentary sanction is to be sought during the coming session for the expenditure of £600,000 on railway rolling stock, including 50 new locomotives, which are to be imported complete.

S.A.R. to Order 50 Locomotives.—The South African Railways Administration is inviting quotations for 50 steam locomotives, Class 19C type (4-8-2 wheel arrangement with bogie tenders). The last date for receiving quotations is February 26. Specifications and drawings are being forwarded by air mail.

Railway Rolling Stock Industry in Canada.—According to the Dominion Bureau of Statistics at Ottawa, 38 Canadian factories manufacturing or repairing cars and locomotives or making parts such as wheels, tyres, brakes, &c., had a production last year valued at $32,465,192, a decline of 52 per cent. during the year. The industry was capitalised at $87,289,160 and employed last year 15,612 persons earning $17,460,142.

G.W.R. Chairmanship.—Our attention has been called to a statement in *The Evening Standard* of Wednesday regarding the chairmanship of the Great Western Railway Company, an official announcement regarding which is expected to be made to-day (Friday). Our contemporary is in error in stating that "the G.W.R. organisation differs from other railways in that its departmental heads report direct to the chairman and not to the general manager," but might relate to the L.M.S. organisation, where the vice-presidents report to the president who is also chairman of the company.

Swedish Mobile Exhibition.—Art exhibitions on wheels are being planned by the Swedish National Museum and the Swedish State Railways. This is an extension of the system of mobile exhibitions which the museum is at present arranging in different parts of the country and which have met with considerable success. The State Railways have designed an ingenious exhibition car, about 45 ft. long, and with ample wall space which can be increased by detachable screen walls. The car, which also contains an office for the museum official, an entrance hall with a cloakroom, and storing space for paintings, is equipped with elaborate lighting arrangements and a specially constructed hot water heating system. Below the floor are storage facilities for holding chairs by means of which the carriage can be turned into a lecture room.

Railway Convalescent Homes Banquet.—Mr. William Whitelaw, Chairman of the London & North Eastern Railway Company, who is President of the Railway Convalescent Homes, will take the chair at the Spring Banquet to be held at the Wharncliffe Rooms of the Hotel Great Central, on Monday, March 5.

Big Increase in Half-day L.M.S.R. Excursion Traffic.—Over 232,000 more passengers were carried by L.M.S.R. half-day excursion trains during the past year than in 1932. In 1933 the L.M.S.R. ran 7,848 half-day excursion trains which carried 2,678,010 passengers, as compared with 7,073 trains and 2,445,051 passengers in the previous year.

Swedish Railcars.—The Vastergotland-Gothenburg Railway has just ordered three petrol-engined Austro-Daimler railcars of the type now running on the Austrian Federal Railways, and three Asea cars with electric transmission, the cost of the six vehicles being approximately £27,500. The Swedish State Railways Administration has also ordered a number of motor-coaches for service over its electrified lines.

Poppet Valves.—At the invitation of the Crewe Technical College Engineering Society, Mr. E. C. Poultney delivered on Saturday evening last a lecture on the application of poppet valves for the distribution of steam in locomotive cylinders. The lecture, which was delivered at the College and illustrated by a large number of slides, described the ALE-OC and RC equipment as developed by Associated Locomotive Equipment Limited. Actual parts of the RC gear were also exhibited.

Bridge and Structural Engineers.—At the annual general meeting of the National Federation of Bridge and Structural Engineers, on January 19, Mr. E. A. Willson, Chairman, in reporting the progress of the federation during the past year, said they were just beginning to realise the effects of tariff protection in the home market for steel, and at the same time an improvement in the volume of constructional work. The Government could not give full weight to the views of individual firms or local associations unless the industry could co-operate in one single organisation. They must, therefore, look forward to an organisation of the general scope of their federation as the mouthpiece of their industry throughout the coming years. It was common knowledge that a strengthened central organisation for the steel industry would be formed within a measurable period of time, and it was the intention of the federation and the industry it represented to throw every ounce of weight into the scale on the side of efficiency in that central organisation of the iron and steel industry of the country.

Transport of Rabbits from Scotland.—The Railway Rates Tribunal on January 16 approved new rates considerably below the standard for the transport of dead rabbits from Scotland to England by passenger train. Mr. Cole Deacon, for the railway companies, said that the large number of rabbits coming from Australia had had a serious effect on the Scottish rabbit-trapping industry. A low transport rate was necessary to help it to be carried on.

Venezuelan Railcar Trials.—A 100-b.h.p. petrol railcar built by the Wismar Waggonfabrik for the Eran Ferrocarril de Venezuela was recently tried out between Wernigerode and Nordhausen in the Harz Mountains, special axles being fitted for the purpose in order to accommodate the difference in gauge between the 3 ft. 6 in. width in Venezuela and the one metre of the German line. The car, which tares only 10 tons despite a double-bogie layout, is now at work in Venezuela at altitudes up to 4,300 ft. above sea-level.

Additions to L.M.S.R. Derby Museum.—The L.M.S.R. has added to the museum at its Derby locomotive works three models of old types of rolling-stock of the former Lancashire & Yorkshire Railway. The models are respectively a wagon chassis; a non-corridor coach with four first-class compartments; and a composite carriage of 1894, having two first-class, two second-class, two third-class, and two lavatory compartments. The last-named model is the largest, being 6 ft. 1¾ in. over buffers, 13 in. wide, and 18 in. high.

Station Platform Gap.—Damages of £65 and costs were awarded at Southwark County Court, on January 15, against the Southern Railway Company to Mr. G. W. Horton, who in alighting at Clapham Junction, fell between the carriage and the platform and was injured. The railway company agreed that there was a gap between train and platform, but denied that it was dangerous to a passsenger alighting with reasonable care. The platform had been passed by the Board of Trade. In answer to questions put by the Judge, the jury found that the space between platform and train was a source of danger to passengers alighting with ordinary care, and that there was not sufficient light to show the edge of the platform to the person using ordinary care. Judge Moore decided that plaintiff's failure to notice the gap did not in the circumstances amount to failure to take reasonable care. There was an invitation to the plaintiff by

the company to alight coupled with the implied assurance that he could do so safely. A stay of execution was granted.

Spanish Railway Accident.—A Madrid-Santander train ran into a landslip and was derailed on Wednesday. Four persons are reported to have been killed.

The Drumm Battery.—The Drumm electric battery, by which certain suburban trains between Dublin and Bray, Great Southern Railways, are driven is to be used for road transport. Ten Drumm battery road goods vehicles are shortly to be put in service.

New G.W.R. Halts.—A new halt at New Dale, between Lawley Bank and Ketley, will be opened on January 29, and another at Wynnville, between Ruabon and Johnston and Hafod, on February 1. These will bring the number of halts opened since 1930 up to 65.

Turner & Newall Limited.—This company has agreed to purchase a controlling interest in the businesses of the Keasbey and Mattison Company and the Ambler Asbestos Shingle and Sheathing Company, both of Ambler, Pennsylvania, U.S.A. The Keasbey and Mattison Company owns and operates factories for the manufacture of asbestos textiles, friction linings, magnesia and other insulation products, and also owns and operates the Bell asbestos mine at Thetford, Quebec, Canada. The Ambler Asbestos Shingle and Sheathing Company owns and operates factories at Ambler and St. Louis for the manufacture of asbestos-cement products.

Nationalisation of Swedish Private Lines.—The absorption of the Swedish private lines by the State Railways, in order to attain uniform administration, is being seriously discussed, and the Railway Board is investigating the conditions of an eventual amalgamation. Reuters Trade Service reports that the first part of the investigation is already terminated, but the most important part, the inquiry into total running costs, will take another year. The results so far obtained indicate that the cost of administration, which is now Kr. 6,390,000 per annum for the 47 private railways in question, would be reduced by Kr. 2,422,000 to Kr. 3,968,000 if an amalgamation were effected. As we announced in our issue of September 8 last, the important Upsala-Gafle and East Coast Railways were taken over by the State as from August 1.

L.M.S. Operating Staff Dinner at Crewe.—The tenth annual dinner of the staff of the Divisional Superintendent of Operation, L.M.S.R., Crewe, was held at the Crewe Arms Hotel, Crewe, on Thursday, January 18, under the chairmanship of Mr. L. D. Ford, Divisional Superintendent of Operation. Mr. W. Paterson, Motor Power Assistant, proposed the toast of "The L.M.S.," and Mr. C. R. Byrom, Chief Operating Manager, in responding, observed that the passenger and freight traffic was definitely on the upgrade, and that there was already every indication that another heavy year was in front of them. He was satisfied that the excellent efforts the staff made last year would again be forthcoming to meet the demands of the situation this year. Other toasts followed.

New Electrical Plant Company.—A. Reyrolle & Co. Ltd., electrical engineers and manufacturers, of Hebburn-on-Tyne, has acquired an interest in the Parolle Electrical Plant Co. Ltd., a private company which has been formed with the object of undertaking the construction of electrical power and other works and the acquisition of interests in manufacturing and other undertakings in any part of the world. The Parolle Company has purchased from the executors of the late Sir Charles A. Parsons shares held by him in C. A. Parsons & Co. Ltd. The authorised share capital of the Parolle Company is £500,000, of which £260,000 have been issued in ordinary shares, and these have been subscribed by A. Reyrolle & Co. The directors of the Parolle Company are Mr. Norbert Merz and Mr. H. W. Clothier, directors of A. Reyrolle & Co., and Mr. F. G. H. Bedford, managing director of C. A. Parsons & Co.

Kitson & Co. Ltd.—The business of this famous locomotive manufacturing company has suffered seriously from recent conditions. These include the depression of world trade, which affects one of the special markets—the Colonies—the attitude in India (for which country purchases have been made to a large extent on the Continent), and the amalgamation of the British railways which do most of their locomotive work in their own shops. The company has therefore found it necessary to explore openings for other trades, but the search has been long and costly. While there is a good prospect of lucrative work in the making of agricultural tractors and certain special types of metal presses, the company's resources have been drawn upon to such an extent that the directors have asked the debenture holders to appoint a receiver in order to protect the position. The Receiver and Manager is Sir Leonnard J. Coates, F.C.A., and the personnel of the company will remain in association with him, thus securing continuity in all matters of design and technique.

G.W.R. Gloucester Ambulance Corps Annual Dinner.—This function was held at Gloucester on January 20, Mr. L. J. A. Callaway (District Goods Manager and Vice-Chairman of the Corps) presiding in the absence through indisposition of the President (Mr. S. Morris). Those present included :—The Mayor (Mr. T. Hannam-Clark), the City High Sheriff (Mr. A. B. Clutterbuck), the City Member (Mr. H. Leslie Boyce), Mr. R. H. Nicholls (late Superintendent of the Line, G.W.R.), Mr. J. W. F. Jones (Assistant District Goods Manager), Mr. R. H. B. Nicholls (Assistant Divisional Superintendent, Gloucester), and Mr. W. Redpath (General Manager, Gloucester Wagon Company). In proposing the toast of "The G.W.R. Gloucester Combined Ambulance Corps," Mr. H. Leslie Boyce made sympathetic reference to the death of Lord Churchill. He also alluded to the serious loss the Corps had sustained through the death of Mr. J. C. Lane, for 20 years Divisional Secretary of the Corps. Mr. Boyce reminded his hearers that the first G.W.R. ambulance class was held in the city in 1889 and that after some 23 years of study and practice the Corps had been founded in 1912. It was a matter for the warmest congratulation to all concerned that so much useful work had been accomplished, and so many distinctions had been achieved by the Corps before it attained its majority in February of last year.

Road Accidents in 1933.—The Home Office report upon road accidents in 1933 has now been published. It records that throughout the whole of Great Britain, 7,125 persons were killed and 216,401 were injured, or nearly 20 killed and 600 injured daily. There are, therefore, 25 casualties—including one death—on the roads every hour, night and day, or roughly one every two minutes, the average during the day-time obviously being about one every 1½ minutes.

Sir Malcolm Campbell on Rail and Road.—Sir Malcolm Campbell addressed the British Railway Stockholders' Union luncheon yesterday, and, after tracing the development of transport in this country from the earliest times, dealt with the relative place in our present civilisation of road and rail. Before roads were made, most of the necessary transport depended upon pack animals, who picked their way over the country, always trying to obtain a firm foothold, and thus followed tracks which seldom took the most direct route. Later on earth roads were constructed and encouraged the use of horse-drawn wagons. The heavier of these caused so much damage to such roads that a prohibition was put upon wagons requiring more than four horses to draw them. This effectively checked road development, and made it easier to obtain foods by sea from abroad than to make them at home and transport them by land. The genesis of the modern highway was due to the genius of Telford and Macadam. The term "highway" originated from the fact that roads were built above the level of the surrounding ground in order that the water might drain off them. Later came canals, and then railways, and now again the intensive development of road transport. Sir Malcolm Campbell thought it impossible to compare road and rail transport, as they had essentially different functions. For mass transport the railways were indispensable, both for goods and passenger traffic. To move by road the coal at present carried by the railways in this country, every one of the two million odd motor vehicles would be required to work 24 hours a day, seven days a week. Sir Malcolm said that

there was still room for great improvement in railway transport by the use of lighter rolling stock, the adoption of higher speeds, and the more careful attention to detail, so that exceptions to the comfort the railways claimed to provide should be eliminated. Mr. Ashley Brown moved a vote of thanks to Sir Malcolm Campbell, which was seconded by Mr. D. Ross-Johnson and carried with acclamation. Mr. G. E. Orton proposed a vote of thanks to Sir Charles Stuart-Williams, who presided over the luncheon. Others among the large company present were: Mr. Wyndham Clark, Sir Godfrey Dalrymple-White, Brigadier Fisher, Admiral Sir Edward Inglefield, Col. C. R. Kelly, Mr. W. G. Pape, Maj.-Gen. S. C. Peck, Col. Raymond, Mr. D. Ross-Johnson.

Annual Dinner of the Institute of Transport.—The next annual dinner of the Institute of Transport will be held at the Connaught Rooms, Great Queen Street, London, W.C.2, on Friday, February 16, at 6.30 for 7 p.m. The President of the Institute (Mr. William Whitelaw) will occupy the chair, and the principal guests will be the Rt. Hon. Lord Macmillan, P.C., the Hon. Oliver Stanley, M.P. (Minister of Transport), and the Lord Provost of Edinburgh (Mr. William J. Thomson, Chairman and Managing Director, Scottish Motor Traction Co. Ltd.).

Pullman Car Sandwich.—Judgment against the Pullman Car Company for £375 with costs was given by Mr. Justice Goddard in the King's Bench Division on January 18 in favour of Miss J. M. D. Shearing, who alleged that she had contracted ptomaine poisoning on July 28 last from eating a gorgonzola cheese sandwich supplied by the company. There was no medical record of any case of ptomaine poisoning from gorgonzola, and the opinion was expressed that plaintiff's illness was due to something else she had eaten earlier in the day. The judge found that there was no negligence on the part of the company, but that the plaintiff had contracted ptomaine poisoning and that the sandwich had been in some way contaminated.

British and Irish Railway Traffic Returns

GREAT BRITAIN	Totals for 3rd Week			Totals to Date		
	1934	1933	Inc. or Dec.	1934	1933	Inc. or Dec.
	£	£	£	£	£	£
L.M.S.R. (6,941¾ mls.)						
Passenger-train traffic ...	358,000	349,000	+ 9,000	1,057,000	1,044,000	+ 13,000
Merchandise, &c. ...	440,000	374,000	+ 66,000	1,255,000	1,091,000	+ 164,000
Coal and coke ...	276,000	272,000	+ 4,000	799,000	740,000	+ 59,000
Goods-train traffic ...	716,000	646,000	+ 70,000	2,054,000	1,831,000	+ 223,000
Total receipts	1,074,000	995,000	+ 79,000	3,111,000	2,875,000	+ 236,000
L.N.E.R. (6,339 mls.)						
Passenger-train traffic ...	231,000	231,000	—	700,000	699,000	+ 1,000
Merchandise, &c. ...	331,000	267,000	+ 64,000	900,000	761,000	+ 139,000
Coal and coke ...	262,000	243,000	+ 19,000	727,000	661,000	+ 66,000
Goods-train traffic ...	593,000	510,000	+ 83,000	1,627,000	1,422,000	+ 205,000
Total receipts	824,000	741,000	+ 83,000	2,327,000	2,121,000	+ 206,000
G.W.R. (3,753 mls.)						
Passenger-train traffic ...	157,000	160,000	— 3,000	469,000	477,000	— 8,000
Merchandise, &c. ...	171,000	149,000	+ 22,000	503,000	439,000	+ 64,000
Coal and coke ...	111,000	111,000	—	335,000	329,000	+ 6,000
Goods-train traffic ...	282,000	260,000	+ 22,000	838,000	768,000	+ 70,000
Total receipts	439,000	420,000	+ 19,000	1,307,000	1,245,000	+ 62,000
S.R. (2,181 mls.)						
Passenger-train traffic ...	235,000	229,000	+ 6,000	698,000	692,000	+ 6,000
Merchandise, &c. ...	58,500	52,000	+ 6,500	162,000	152,500	+ 9,500
Coal and coke ...	37,500	37,000	+ 500	104,000	98,500	+ 5,500
Goods-train traffic ...	96,000	89,000	+ 7,000	266,000	251,000	+ 15,000
Total receipts	331,000	318,000	+ 13,000	964,000	943,000	+ 21,000
Liverpool Overhead ... (6¼ mls.)	1,119	1,027	+ 92	3,401	3,205	+ 196
Mersey (4½ mls.) ...	4,159	3,871	+ 288	13,338	12,594	+ 744
*London Passenger Transport Board ...	512,900	—	—	14,399,500	—	—
IRELAND						
Belfast & Co. Dn. pass. (80 mls.)	1,978	2,080	— 102	5,704	5,819	— 115
,, ,, goods	599	551	+ 48	1,412	1,287	+ 125
,, ,, total	2,577	2,631	— 54	7,116	7,106	+ 10
Great Northern pass. (562 mls.)	6,400	7,250	— 850	22,200	24,750	— 2,550
,, ,, goods	7,100	8,950	— 1,850	20,050	24,150	— 4,100
,, ,, total	13,500	16,200	— 2,700	42,250	48,900	— 6,650
Great Southern pass. (2,158 mls.)	17,869	17,353	+ 516	54,549	55,061	— 512
,, ,, goods	31,696	28,120	+ 3,576	85,935	87,113	— 1,178
,, ,, total	49,565	45,473	+ 4,092	140,484	142,174	— 1,690

* 29th week.

British and Irish Railway Stocks and Shares

Stocks	Highest 1933	Lowest 1933	Prices Jan. 24 1934	Prices Rise/Fall
G.W.R.				
Cons. Ord. ...	55½	31	57½	+½
5% Con. Prefce. ...	109¾	69½	113	—
5% Red.Pref.(1950)	109¼	87½	112	+1
4% Deb.	108 15/16	99¼	108½	—
4½% Deb.	108	100¾	110½	—
4½% Deb.	116	106	117½	—
5% Deb.	128	117¼	128½	—
2½% Deb.	65	60	64½	—
5% Rt. Charge ...	124	111½	124½	—
5% Cons. Guar. ...	122	103	124½	+1
L.M.S.R.				
Ord.	29⅞	12⅛	27	—
4% Prefce. (1923)	51	17	55	+2
4% Prefce. ...	72	33¼	76	+1
5% Red. Prf. (1955)	93	47¼	96½	—
4% Deb.	103¼	89½	102	−1
5% Red.Deb.(1952)	114	105	112½	—
4% Guar.	97¼	68⅝	99	—
L.N.E.R.				
5% Pref. Ord. ...	22½	7¾	21	−½
Def. Ord.	10¾	4⅛	10	−¼
4% First Prefce. ...	65½	19⅝	65½	+½
4% Second Prefce.	40½	12¼	39½	+½
5% Red.Pref.(1955)	83¾	27	83½	—
4% First Guar. ...	94¾	58¼	96	−½
4% Second Guar.	89¼	48	90	—
3% Deb.	77	60¼	76	−1
4% Deb.	102¾	80	101	−1
5% Red.Deb.(1947)	112	102½	111	—
4½% Sinking Fund Red. Deb.	107½	98¾	106½	—
SOUTHERN				
Pref. Ord.... ...	71	27¾	70	+1
Def. Ord.	24⅝	9⅝	20½	—
5% Prefce. ...	107 11/16	74	109	−½
5% Red.Pref.(1964)	107¾	78⅞	112	+1
5% Guar. Prefce.	124¼	102¾	122½	—
5% Red.Guar.Pref. (1957)	115⅝	103½	115½	—
4% Deb.	107½	96¾	106	−1
5% Deb.	126½	114¼	127½	—
4% Red. Deb. 1962–67	107¼	100	106½	—
BELFAST & C.D.				
Ord.	6	4	6	—
FORTH BRIDGE				
4% Deb.	99½	95½	99½	—
4% Guar. ...	98½	94	99½	—
G. NORTHERN (IRELAND)				
Ord.	7½	3½	5	—
G. SOUTHERN (IRELAND)				
Ord.	28	16	25	—
Prefce.	24	12⅛	19	−¾
Guar.	42	16¾	44	—
Deb.	60	30⅞	62	+ 2
L.P.T.B.				
4½% "A" ...	117⅞	112	116	—
5% "A"	127¼	119¼	126	−½
4½% "T.F.A." ...	111¼	106	109½	—
5% "B"	122½	114	121	−½
"C"	86¾	74½	85	—
MERSEY				
Ord.	16¼	5	13	—
4% Perp. Deb. ...	83	63⅞	81½*	−1
3% Perp. Deb. ...	62	51	62½*	+1
3% Perp. Prefce....	50⅝	27	49½	—

* ex dividend.

OFFICIAL NOTICES

South Indian Railway Company Limited

THE Directors are prepared to receive Tenders for the supply of :—

ROLLED STEEL DISC WHEELS AND AXLES.

Specifications and Forms of Tender will be available at the Company's Offices, 91, Petty France, Westminster, S.W.1.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Co. Ltd., marked "Tender for Rolled Steel Disc Wheels and Axles," with the name of the firm tendering, must be left with the undersigned not later than 12 noon on Friday, the 9th February, 1934.

The Directors do not bind themselves to accept the lowest or any Tender.

A charge, which will not be returned, will be made of 10s. for each copy of the Specification.

Copies of the drawings may be obtained at the Offices of the Company's Consulting Engineers, Messrs. Robert White & Partners, 3, Victoria Street, Westminster, S.W.1.

A. MUIRHEAD,
Managing Director.

91, Petty France,
Westminster, S.W.1.

24th January, 1934.

SUDAN RAILWAYS require the services of an ASSISTANT SUPERINTENDENT OF STORES, age 28-32. Candidates must possess good educational qualifications with University engineering degree or equivalent, have had general experience in railway or engineering stores, works and stores accounts, and control of staff.

Starting rate of pay £E.600-660 per annum, according to age and qualifications, subject to present abatement of 7½ per cent. (£E.1 = £1 0s. 6d.). Permanent and progressive post if satisfactory. Free first-class passage; liberal leave; strict medical examination.

Apply by letter, giving full particulars of training, qualifications and experience, with copies of testimonials, to CONTROLLER, Sudan Government London Office, Wellington House, Buckingham Gate, London, S.W.1, marking envelope "Stores."

PORTABLE 3 component Vibration Recorder (stock soiled) for sale; Swiss made.—Particulars and price from THE ANGLO-SWISS ELECTRICAL CO. LTD., 15, Victoria Street, S.W.1.

The Chinese Government Purchasing Commission

THE Commission is prepared to receive Tenders from British manufacturers for the supply of :—

(A) 4 LOCOMOTIVES WITH TENDERS,
(B) 12 PASSENGER CAR UNDERFRAMES WITH BOGIES.

Tender Forms, Specifications and Drawings can be obtained for (A) on and after January 31st, and (B) on and after January 26th, at the offices of the Consulting Engineers, Messrs. Sandberg, 40, Grosvenor Gardens, London, S.W.1.

Non-returnable fees will be charged for each set of documents: £2 10s. for (A) and £1 10s. for (B)

"IMPROVEMENTS IN AND RELATING TO JOURNAL BEARINGS FOR RAIL VEHICLES."

The Proprietors of British Patent No. 345,510 desire to arrange for the commercial working of this Patent by sale outright or by licences granted on participating and reasonable terms.

Particulars obtainable from TECHNICAL RECORDS LIMITED, 59-60, Lincoln's Inn Fields, London, W.C.2.

Floods on the Transandine Railway

(*From our Argentine Correspondent*)

Bad luck seems to dog the steps of the Transandine Railway. The loss of revenue caused by the suspension of its services over a long perod has now been aggravated by a disastrous washout, the worst in the history of the line, which occurred on the Argentine Section on the night of January 10. The main cause was a cloudburst over Mount Tupungato, but the river Mendoza, which the Transandine Railway skirts on the Argentine side, was already swollen considerably due as a result of the late thaws in the Andes. Some idea of the force gathered by the waters and the damage done can be imagined from the fact that the river drops from an altitude of over 10,000 ft. at Las Cuevas to some 2,500 ft. at Mendoza, the distance being a little over 100 miles. As usual in these cases, reports of the damage done were much exaggerated at first, but even so it is very considerable, the Transandine Railway having had several bridges and culverts washed away, and long stretches of permanent way destroyed. First estimates point to at least six weeks elapsing before traffic can be resumed, and as it is the height of the summer tourist season the Buenos Ayres & Pacific and Transandine Railways will be badly hit.

Washouts have already occurred on the motor roads connecting Argentina and Chile on the eastern slopes, so that for some time to come it seems as if the air will constitute the only means of travel connection between the two countries. The report of the Light & Power Company states that the waters rose to a height of 20 metres inside its power house at Cacheuta, and, although advice was received from higher up the mountain of what was to be expected and several emergency measures were taken, nothing could be done against the compact wall of water, mud, and stones, several metres high, which came tumbling down the river bed, carrying everything before it. Some days will elapse before the real extent of the catastrophe is known, but as far as the railway is concerned, the Transandine Railway has already issued an official report stating that very serious damage has been done to the permanent way and several bridges between Cacheuta and Mendoza.

[A subsequent telegram from Mendoza states that Mr. Mervyn Ryan, General Manager of the Buenos Ayres and Pacific Railway, has announced that the damage recently caused by an avalanche is much greater than was expected, and that the Transandine Railway must remain closed to passenger and goods traffic for a long time.—ED. *R.G.*]

RAILWAY AND OTHER REPORTS

Great Northern Railway (Ireland).—The Secretary writes, January 24 :—"The directors regret that the prolonged stoppage of work in the early part of the year, the increasing fiscal restrictions on cross-border traffic and the continued competition of other forms of transport have so diminished the receipts for the year 1933 that they are unable to recommend the payment of any dividends on the preference and ordinary stocks."

Transport "C" Stock.—The London Passenger Transport Board has written to the Stock Exchange saying that it is impossible as yet to make any announcement in regard to the payment of an interim dividend on Transport "C" stock. This is because of the complicated negotiations which must necessarily ensue with the group railway companies in connection with the pooling arrangements to be concluded in accordance with the London Passenger Transport Act.

Scottish Motor Traction Co. Ltd.—This company, in which the L.N.E.R. and L.M.S.R. companies have a substantial interest, reports a profit for the year to October 31 last, after providing for depreciation and income tax, and including dividends from subsidiaries, of £139,334. There has been appropriated for dividend on preference shares £48,750, written off goodwill £19,200, and transferred to contingency reserve £12,600, leaving £58,784. The directors recommend a dividend on the ordinary shares for the year of 10 per cent., less tax (unchanged). There will then remain £2,788, which with balance brought in gives £57,396 to be carried forward.

Midland Railway Company of Western Australia.—Gross traffic receipts (in Australian currency) for the year ended June 30, 1933, were £156,705, a decrease of £533 in comparison with 1931-32, and the working expenses of £74,248 showed a reduction of £1,125, so that the net receipts of £82,457 improved by £592. The operating ratio was 47·38 per cent. After deducting Australian taxation, &c., transferring £30,000 to depreciation and renewals account, and adding £16,361 brought forward, there remains a sum of £50,975. From this amount it is proposed to transfer £5,000 to exchange contingency account, and to pay 5 per cent. on the second mortgage cumulative income debenture stock for the year, which requires £29,618, leaving £16,357 to be carried forward.

Railway Share Market

Business in the stock and share markets has been of satisfactory volume, and the current tendency has been generally in favour of holders of stocks. Now that the amount of selling induced by the first upward movement in home railway stocks has slackened, there is a stronger undercurrent, and Stock Exchange dealers are more prepared to make closer prices in stocks than was previously the case. Of the big groups, London Midland & Scottish first preference and the 1923 preference stocks have been mainly in request on encouraging estimates of the current year's net revenue.

The circulation of estimates of probable net revenue during 1934 by a leading City firm has had the effect of concentrating attention on one or two stocks which were more favourably commented on. It should be emphasised that the new year is less than a month old, and estimates of probable net revenue must be largely in the nature of guesswork based as they are on a percentage of economies now a year old and a problematical increase in gross traffic receipts. Subject to this caution, brokerage firms are inclined to follow the lead and to take an optimistic, but long-term, view of the outlook for home railway stocks. This week's traffic returns were regarded favourably, and there would probably have been a stronger response to the increases reported, especially in the case of the Southern, had the dividend declarations and the issue of the reports not been impending. Operators prefer in most instances to await these announcements. An unusual amount of business has been passing in the debenture stocks of the Mersey Railway, the 3 per cent. (1882) having been active up to 63¼ ex-dividend.

London Transport Board "C" stock tended to weaken on the intimation that the Board cannot consider the question of an interim dividend until negotiations in connection with the pooling arrangements with the group railway companies are finally completed. The Stock Exchange was inclined to take a querulous view of this statement and to suggest that it might mean an intention to pass the payment of an interim dividend for revenue reasons. Foreign railway stocks were irregular, but Argentine issues showed improvement on the receipt of encouraging advices regarding crop prospects. An improvement in the exchange also helped. Among the chief movements was a rise of four points in Buenos Ayres Central first debenture stock to 20-25, with business marked at 20½. Midland Uruguay 5 per cent. prior lien stock advanced five points at 34-38, but no business was recorded. In the Colonial group there was a further demand for Canadian Pacific common shares. A rise of four points to 93-98 took place in the list price of Midland of Western Australia 2nd mortgage debenture stock. Rhodesia and Mashonaland bearer debentures were again in request.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways.	Miles open 1933–34.	Week Ending	Traffics for Week. Total this year	Inc. or Dec. compared with 1933	No. of Week.	Aggregate Traffics to Date. Totals. This Year.	Last Year.	Increase or Decrease.	Shares or Stock.	Prices. Highest 1933.	Lowest 1933.	Jan. 24, 1934.	Yield (See Note.)
				£	£		£	£	£					
South & Central America.	Antofagasta (Chili) & Bolivia	830	21.1.34	13,510	+ 2,920	3	34,010	27,660	+ 6,350	Ord. Stk.	26	11¾	23	Nil
	Argentine North Eastern	753	20.1.34	10,310	+ 1,000	29	296,000	333,100	— 37,100	,,	14½	5	10½	Nil
	Argentine Transandine	111	13.1.34	1,540	+ 130	28	30,950	5,640	+ 25,310	A. Deb.	55	40	50	8
	Bolivar	170	Dec., 1933	5,350	— 1,250	52	72,700	89,350	— 16,650	6 p.c. Db.	10	5	10	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	15	11	12	4⅝16
	Buenos Ayres & Pacific	2,806	20.1.34	126,000	—	29	2,767,000	2,934,000	— 167,000	Ord. Stk.	26	9716	16	Nil
	Buenos Ayres Central	190	14.1.34	9,079	+ 1,475	29	291,349	268,969	+ 22,380	Mt. Db.	30	10	25½	Nil
	Buenos Ayres Gt. Southern	5,075	20.1.34	254,000	— 42,000	29	5,351,000	5,265,000	+ 86,000	Ord. Stk.	44½	21½	34	Nil
	Buenos Ayres Western	1,926	20.1.34	75,000	— 10,000	29	1,786,000	1,865,000	— 79,000	,,	34½	15¾	26½	Nil
	Central Argentine	3,700	20.1.34	207,000	+ 16,000	29	4,631,000	5,411,000	— 780,000	,,	28½	15	21	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	18	10	12½	Nil
	Cent. Uruguay of M. Video	273	20.1.34	18,144	+ 3,297	29	471,289	448,094	+ 23,195	Ord. Stk.	20	8	13	Nil
	Do. Eastern Extn.	311	20.1.34	3,764	+ 563	29	90,727	94,623	— 3,896	—	—	—	—	—
	Do. Northern Extn.	185	20.1.34	1,772	— 251	29	50,128	54,990	— 4,862	—	—	—	—	—
	Do. Western Extn.	211	20.1.34	2,346	+ 940	29	44,374	41,149	+ 3,225	—	—	—	—	—
	Cordoba Central	1,218	20.1.34	39,000	+ 4,000	29	1,255,000	1,264,000	— 9,000	Ord. Inc.	9¼	2½	6	Nil
	Costa Rica	188	Nov., 1933	18,534	— 3,195	21	99,724	107,788	— 8,064	Stk.	29	20	25	8
	Dorada	70	Dec., 1933	11,000	+ 2,600	52	96,800	83,600	+ 13,200	1 Mt. Db.	76½	68¾	80	7½
	Entre Rios	810	20.1.34	20,500	+ 5,700	29	459,610	470,700	— 11,100	Ord. Stk.	26½	9	19½	Nil
	Great Western of Brazil	1,072	20.1.34	13,100	— 5,600	3	33,800	51,500	— 17,700	Ord. Sh.	23/6	1/2	5/4	Nil
	International of Cl. Amer.	794	Nov., 1933	347,691	— 91,368	47	4,125,768	4,581,088	— 455,320	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	½	1/16	1/2	Nil
	La Guaira & Caracas	22¾	Dec., 1933	3,400	— 4,280	52	55,670	87,795	— 32,125	Stk.	16	10	12½	Nil
	Leopoldina	1,918	20.1.34	22,172	— 1,571	3	52,483	68,721	— 16,238	Ord. Stk.	20¼	10	13	Nil
	Mexican	483	14.1.34	$196,000	+ $21,000	2	$352,600	$327,300	+ $25,300	,,	3	1/2	2½	Nil
	Midland of Uruguay	319	Dec., 1933	11,542	+ 2,105	26	57,230	52,204	+ 5,026	Ord. Stk.	2	1	2	Nil
	Nitrate	407	15.1.34	15,955	+ 13,575	2	15,955	2,380	+ 13,575	Ord. Sh.	78/6	11/16	3/8	Nil
	Paraguay Central	274	20.1.34	3,280	+ 760	29	95,000	81,400	+ 13,600	Pr. Li. Stk.	72	49½	67	815/16
	Peruvian Corporation	1,059	Dec., 1933	54,751	+ 7,517	26	329,691	345,773	— 16,082	Pref.	15¼	5	11½	Nil
	Salvador	100	13.1.34	1,592	— 2,917	29	27,734	57,164	— 29,430	Pr. Li. Db.	70	66½	70	7⅛
	San Paulo	153½	14.1.34	29,721	— 9,285	2	56,588	58,118	— 1,530	Ord. Stk.	102	68	82½	2716
	Taltal	164	Dec., 1933	8,915	+ 7,855	26	31,065	8,115	+ 22,950	Ord. Sh.	1¼	¾	1⅝	615/16
	United of Havana	1,367	20.1.34	10,654	— 3,330	29	379,917	414,596	— 34,679	Ord. Stk.	⅝	2	5½	Nil
	Uruguay Northern	73	Dec., 1933	1,298	— 706	26	7,383	9,915	— 2,532	Deb. Stk.	6	3½	5	Nil
Canada.	Canadian National	23,758	14.1.34	526,632	+ 93,359	2	998,570	833,275	+ 165,295	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	—4 p.c.	Perp. Dbs.	60½	38	58½	615/16
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	99¾	85	99½	4
	Canadian Pacific	17,024	14.1.34	399,000	+ 88,800	2	778,600	629,800	+ 148,800	Ord. Stk.	22⅛	11	16	Nil
India.†	Assam Bengal	1,329	23.12.33	24,247	— 2,106	38	889,713	916,706	— 26,993	Ord. Stk.	79	70	73⅛	4116
	Barsi Light	202	30.12.33	2,865	— 232	39	114,000	102,082	+ 11,918	Ord. Sh.	101¾	70	98½	6116
	Bengal & North Western	2,113	30.12.33	48,218	+ 366	13	608,063	571,659	+ 36,404	Ord. Stk.	292	240	287	5916
	Bengal Deoars & Extension	161	30.12.33	2,946	+ 185	39	117,214	119,177	— 1,983	,,	127	119	125	5⅝
	Bengal-Nagpur	3,269	9.12.33	110,625	+ 9,380	36	3,623,484	3,446,618	+ 176,866	,,	97¼	83½	97½	4⅛
	Bombay, Baroda & C. India	3,089	13.1.34	168,975	+ 8,475	41	5,986,050	5,837,550	+ 148,500	,,	112	107	110½	5716
	Madras & South'n Mahratta	3,230	30.12.33	102,750	— 13,443	39	4,195,152	4,023,474	+ 171,678	,,	127	114¼	122½	7816
	Rohilkund & Kumaon	546	30.12.33	10,804	+ 900	13	108,888	100,337	+ 8,551	,,	260	225	252	5116
	South India	2,526	30.12.33	77,109	+ 1,392	39	3,068,145	3,117,216	— 49,071	,,	119½	112	116½	67⅛
Various.	Beira-Umtali	204	Nov., 1933	49,677	+ 11,566	8	99,606	80,652	+ 18,954	—	—	—	—	—
	Bilbao River & Cantabrian	15	Dec., 1933	988	+ 48	52	18,980	21,553	— 2,573	—	—	—	—	—
	Egyptian Delta	621	31.12.33	8,847	— 1,936	39	177,088	197,955	— 20,867	Prf. Sh.	13132	13¼	2	Nil
	Great Southern of Spain	104	13.1.34	2,733	— 45	2	5,022	4,439	+ 583	Inc. Deb.	4	3	5½	Nil
	Kenya & Uganda	1,625	Aug., 1933	159,746	+ 12,456	35	1,523,550	1,273,216	+ 250,334	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	53	33½	36½	9916
	Mashonaland	913	Nov., 1933	91,764	+ 30,921	8	186,337	122,843	+ 63,494	1 Mg. Db.	91¾	42	93	5⅝
	Midland of W. Australia	277	Nov., 1933	12,568	— 412	21	65,111	61,532	+ 3,579	Inc. Deb.	89	70	95½	4516
	Nigerian	1,903	9.12.33	56,570	— 3,040	37	1,009,085	1,106,842	— 97,757	—	—	—	—	—
	Rhodesia	1,538	Nov., 1933	156,230	+ 50,618	8	316,792	213,960	+ 102,832	4 p.c. Db.	98½	80¾	98½	4116
	South African	13,151	23.12.33	522,197	+ 83,792	39	17,306926	14,911,868	+2,395,058	—	—	—	—	—
	Victorian	6,172	Oct., 1933	762,659	— 44,068	17	2,797,539	2,885,003	— 87,464	—	—	—	—	—
	Zafra & Huelva	112	Nov., 1933	10,926	+ 149	47	123,826	120,955	+ 2,871	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16.

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend. ‡ Average rate of exchange for the week :—This year 33564. Last year 42132.